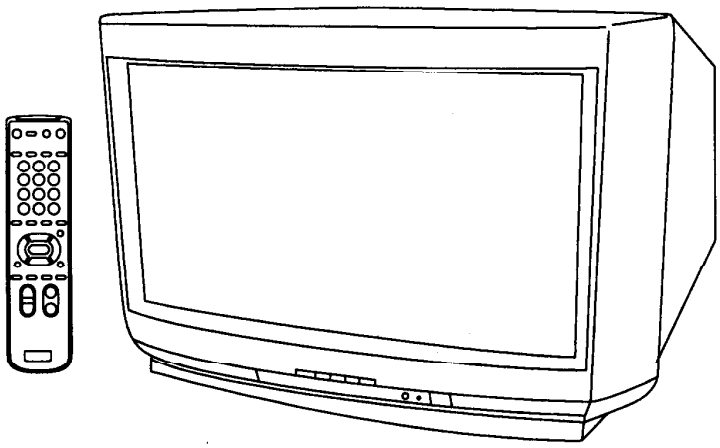
SERVICE MANUAL

BG-1L CHASSIS

MODEL	COMMANDER	DEST.	CHASSIS NO.
KV-V28MH1	RM-872	HK	SCC-K56DA
KV-V28MH11	RM-872	ME	SCC-K57FA
KV-V28MN11	RM-872	GE	SCC-K52EA

MODEL	COMMANDER	DEST.	CHASSIS NO.



MICROFILM

TRINITRON® COLOR TV

SONY®

SPECIFICATIONS

	KV-V28MH1, KV-V28MN11	Note
Power requirements	110-240 V AC, 50/60 Hz	
Power consumption (W)	Indicated on the rear of TV	
Television system	B/G, I, D/K, M	
Color system	PAL, PAL 60, SECAM, NTSC4.43, NTSC3.58	
Stereo system	NICAM Stereo B/G, I ; A2 Stereo (German) B/G	
Teletext language	English, German, Swedish, Italian, French, Spanish	KV-V28MH11, KV-V28MN11
Channel coverage		
B/G	VHF : E2 to E12 / UHF : E21 to E69 / CATV : S01 to S03, S1 to S41	
I	UHF : B21 to B68 / CATV : S01 to S03, S1 to S41	
D/K	VHF : C1 to C12, R1 to R12 / UHF : C13 to C57, R21 to R60 / CATV: Z1 to Z39, S01 to S03, S1 to S41	
M	VHF : A2 to A13 / UHF : A14 to A79/ CATV: A-8 to A-2, A to W+4, W+6 to W+84	
Antenna	75-ohm external terminal	
Audio output (speaker)	15W + 15W	
Number of Terminal		
Video	Input: 4 Output: 1	Phono jacks; 1 Vp-p, 75 ohms
Audio	Input: 4 Output: 1	Phono jacks; 500 mVrms
S1 Video	Input: 2	Y: 1 Vp-p, 75 ohms, unbalanced, sync negative C: 0.286 Vp-p, 75 ohms
Headphone	Output: 1	Mini jack
Picture tube	28 in. (Wide Trinitron Plus)	
Tube size (cm)	71	Measured diagonally
Screen size (cm)	66	Measured diagonally
Dimensions (w/h/d, mm)	768 × 511 × 518	
Mass (kg)	44.5	
Accessory (optional)	TV stand (SU-V28G)	

Design and specifications are subject to change without notice.

CAUTION

SHORT CIRCUIT THE ANODE OF THE PICTURE TUBE AND THE ANODE CAP TO THE METAL CHASSIS, CRT SHIELD, OR CARBON PAINTED ON THE CRT, AFTER REMOVING THE ANODE.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTSÅ PUBLISHED BY SONY.

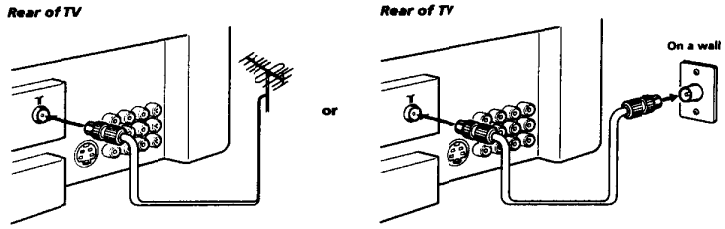
TABLE OF CONTENTS

Getting Started

Connections

Connecting a VHF antenna or a combination VHF/UHF antenna — 75-ohm coaxial cable (round)

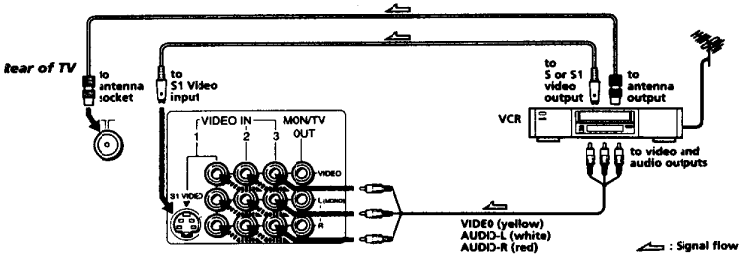
Attach an optional IEC antenna connector to the 75-ohm coaxial cable.
Plug the connector into the ⊤ (antenna) socket at the rear of the TV.



Connecting optional equipment

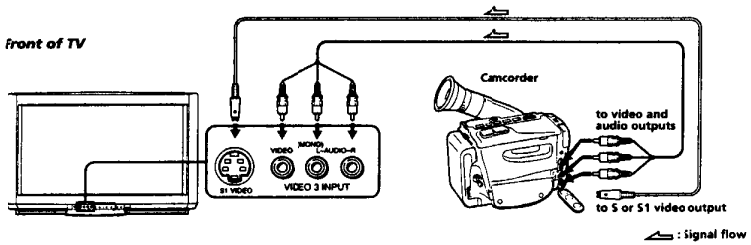
You can connect optional audio/video equipment to your TV such as a VCR, multi disc player, camcorder, video game or stereo system.

Connecting video equipment using video input jacks



SECTION 1 GENERAL

The operating instructions mentioned here are partial abstracts from the Operating Instructions Manual. The page numbers of the Operating Instruction Manual remain as in this manual.



When connecting a monaural VCR
Connectthe yellow plug to VIDEO and the black plug to AUDIO-L (MONO).

When connecting video game equipment
Connectvideo game equipment to the VIDEO 3 INPUT jacks at the front of your TV or the VIDEO IN 3 jacksat the rear of your TV.

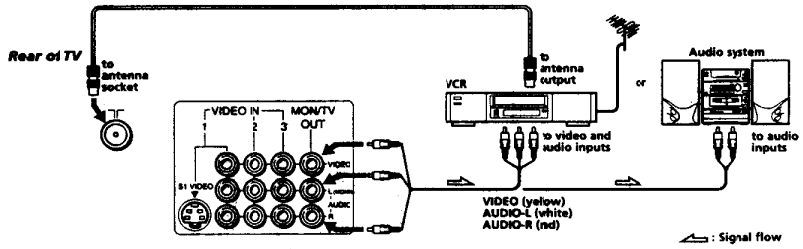
When connecting a VCR to the ⊤ (antenna) terminal
Preset the signal output from the VCR to the program position 0.

When connecting video equipment to the VIDEO 3 INPUT jacks or the VIDEO IN 3 jacks
Do not connect video equipment to the VIDEO 3 INPUT jacks at the front and the VIDEO IN 3 jacks at the rear of your TV simultaneously; otherwise the picture will not be displayed properly on the screen.

If both S1 Video and video signals are input simultaneously
The S1 Video input signal is selected. To view a video input signal, disconnect the S1 Video connection.

Note on the video input
When no signal is input, the screen becomes blue.

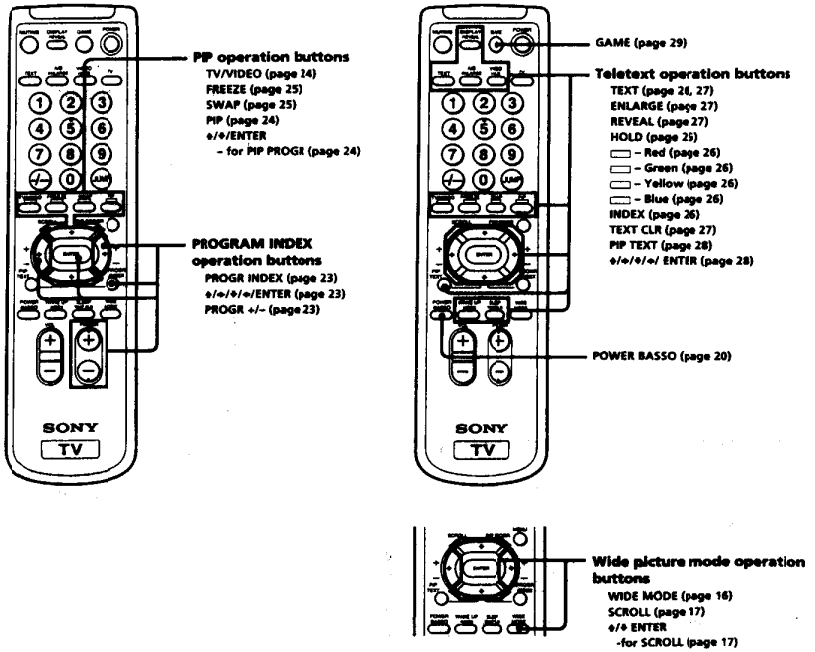
Connecting audio/video equipment using MON/TV OUT jacks



Getting to know the remote commander

Names of buttons on the remote commander are indicated in different colors to represent the available functions.

Label color	Button function
White	For general TV operations.
Green	For Teletext operations.
Yellow	For PIP and PROGRAM INDEX operations.
Blue	For the wide picture mode operations.

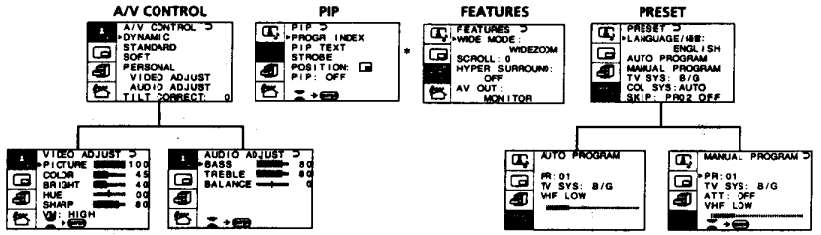


Note

• The Teletext operation buttons are used for KV-V28MN11 only.

Introducing the menus

You car preset TV channels, adjust the picture and sound qualities, and select some settings using the on-screen menus. You can use the buttons on the remote commander or the TV to operate the menus.



(* KV-V28MN11 only)

Getting back to the previous menu (except for AUTO PROGRAM)

Press ◆ or ◆ to move the cursor (▶) to the first line (▭) of each menu, and press ENTER.

Cancelling the menu screen

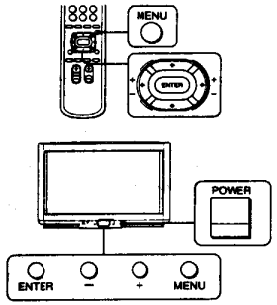
Press MENU.

Notes (except for AUTO PROGRAM)

- When a menu is selected after pressing ENTER, the color of both the menu and the menu symbol change and the cursor (▶) appears beside the first item of the menu.
- When an item on the menu is selected after pressing ENTER, the color of the item changes.
- You can refer to the guide (▭ → ENTER) at the bottom of the menus (except for the A/V CONTROL, FEATURES, and PRESET menus) for the basic operations of the menu.
- If more than approximately 60 seconds elapse after you press a button, the menu screen disappears automatically.

Changing the menu language

If you prefer Chinese to English, you can change the menu language. You can use buttons on the remote commander or the TV.



1 Press POWER to turn on the TV.

2 Press MENU.

3 Press ↑ or ↓ to move the cursor (▶) to the PRESET menu (📁), and press ENTER.

4 Make sure the cursor (▶) appears beside LANGUAGE/语言 and press ENTER.

5 Press ↑/→/↓/← to select中文, and press ENTER.

All of the menus change to Chinese.

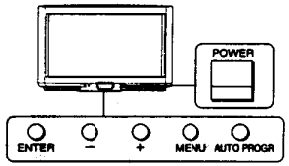
6 Press MENU to return to the normal screen.

Presetting channels

You can preset TV channels easily by storing all the receivible channels automatically. You can also preset channels manually or disable program positions (see page 12).

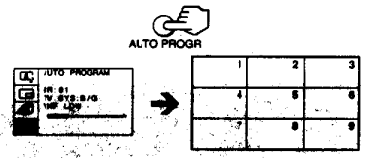
Presetting channels automatically

You can preset up to 100 TV channels in numerical sequence from the program position 1. You can preset channels automatically using the button on the TV or the menu.



1 Press POWER to turn on the TV.

2 Press AUTO PROGR.



The TV starts scanning and presetting channels automatically. When all of the receivable channels are stored, the AUTO PROGRAM menu disappears and the first nine preset TV programs appear on the nine sub screens. The nine sub screens disappear after being displayed for several seconds.

Note

- If you want to return to the normal screen while the nine sub screens are being displayed, you can press PROGR INDEX on the remote commander.

To preset channels automatically using the menu

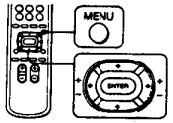
1 Press MENU.

2 Press ↑ or ↓ to move the cursor (▶) to the PRESET menu (📁), and press ENTER.

3 Press ↑ or ↓ to move the cursor (▶) to AUTO PROGRAM, and press ENTER.

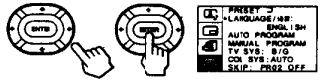
Presetting channels manually

To change the program position for a channel or to receive a channel with a weak signal which you cannot receive by automatic presetting, preset the channel manually.



1 Press MENU.

2 Press ↑ or ↓ to move the cursor (▶) to the PRESET menu (📁), and press ENTER.



3 Select your local TV system.

(1) Press ↑ or ↓ to move the cursor (▶) to TV SYS, and press ENTER.

(2) Press ↑/→/↓/← until your local TV system appears on the menu, and press ENTER.

4 Press ↑ or ↓ to move the cursor (▶) to MANUAL PROGRAM, and press ENTER.

5 Select the program position to which you want to preset a channel.

(1) Make sure the cursor (▶) appears beside PR, and press ENTER.
(2) Press ↑/→/↓/← until the program position you want appears on the menu, and press ENTER.

6 Select the desired channel.

(1) Press ↑ or ↓ to move the cursor (▶) to VHF LOW, and press ENTER.
(2) Press ↑/→/↓/← until the desired channel picture appears on the TV screen, and press ENTER.

7 Press MENU to return to the normal screen.

If the TV signal is too strong

The picture may be distorted. You can reduce the picture distortion as described below.

1 Display the PRESET menu.
2 Press ↑ or ↓ to move the cursor (▶) to MANUAL PROGRAM, and press ENTER.
3 Press ↑ or ↓ to move the cursor (▶) to ATT, and press ENTER.
4 Press ↑/→/↓/← to select ON, and press ENTER.

If the TV system is not properly selected

The picture color may be poor and/or the sound may be noisy. In this case, select the appropriate TV system.

1 Press PROGR +/– or the number buttons to select the program position.
2 Display the PRESET menu.
3 Press ↑ or ↓ to move the cursor (▶) to TV SYS, and press ENTER.
4 Press ↑/→/↓/← until the appropriate TV system appears, and press ENTER.

Notes

- The TV system and the ATT (attenuator) settings are memorized for each program position.
- If you do not know your local TV system, consult your nearest Sony dealer or authorized service center.

Disabling program positions

By disabling unused or unwanted program positions, you can skip those positions when you press PROGR +/–.

1 Press MENU.

2 Press ↑ or ↓ to move the cursor (▶) to the PRESET menu ( ), and press ENTER.

3 Press ↑ or ↓ to move the cursor (▶) to SKIP, and press ENTER.

4 Press ↑ or ↓ until the unused or unwanted program position appears on the menu, and press ENTER.

5 Press ↑/→/↓/← to select ON, and press ENTER.

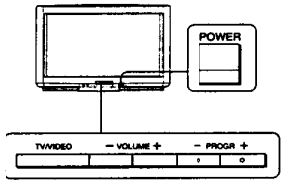
6 To disable other program positions, repeat steps 4 and 5.

7 Press MENU to return to the normal screen.

To cancel the skip setting

1 Display the PRESET menu.
2 Press ↑ or ↓ to move the cursor (▶) to SKIP, and press ENTER.
3 Press ↑ or ↓ until the program position you want to cancel the skip setting appears, and press ENTER.
4 Press ↑/→/↓/← to select OFF, and press ENTER.

Watching the TV



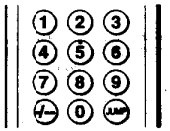
1 Press POWER to turn on the TV.

When the TV is turned on in the standby mode after pressing POWER on the TV, press POWER on the remote commander.

2 Select the TV program you want to watch.

To select a program position directly

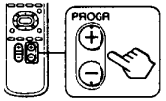
Press the number button.



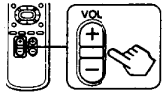
To select a two-digit program position, press "+/–" before the number buttons.
For example: to select program position 25, press "+/–," then "2" and "5."

To scan through program positions

Press PROGR +/– on the remote commander or the TV until the program position you want appears.



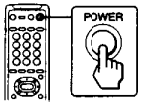
3 Press VOL -/– on the remote commander or VOLUME +/- on the TV to adjust the volume.



Turning off the TV

To turn off the TV temporarily

Press POWER on the remote commander.
The STANDBY indicator lights up.

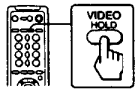


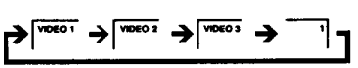
To turn off the TV completely

Press POWER on the TV.

Watching the video input

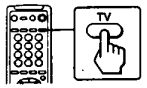
Press VIDEO/HOLD on the remote commander or TV/VIDEO on the TV.





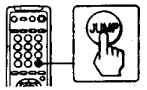
To watch TV

Press TV on the remote commander or TV/VIDEO on the TV.



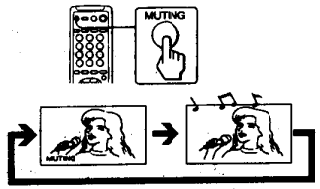
Switching back quickly to the previous channel

Press JUMP.



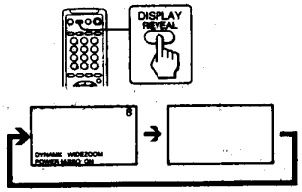
Muting the sound

Press MUTING.



Displaying the on-screen information

Press DISPLAY/REVEAL.



Note

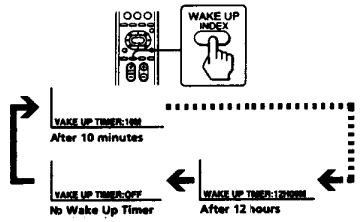
- The on-screen display shows the program position or the video mode, the picture and sound information. The on-screen display for the picture and sound information disappear after being displayed for approximately three seconds.

Setting the Wake Up Timer

You can set the TV to turn on automatically after the period of time you want.

1 Press WAKE UP/INDEX repeatedly to set the timer.

The on-screen display appears.



2 If you want a particular TV program or video mode to be displayed using the Wake Up Timer, select the TV program or video mode.

3 Press POWER on the remote commander or set the Sleep Timer to turn off the TV in the standby mode.

The WAKE UP indicator lights up in amber color.

To cancel the Wake Up Timer, press WAKE UP/INDEX repeatedly until "WAKE UP TIMER: OFF" appears, or turn off the main power of the TV.

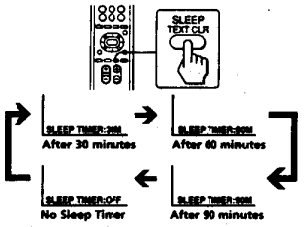
Notes

- The Wake Up Timer starts immediately after the on-screen display disappears.
- The last TV program position or video mode just before the TV turns into the standby mode will appear when the TV is turned on using the Wake Up Timer.
- If no buttons or controls are pressed for more than two hours after the TV is turned on using the Wake Up Timer, the TV automatically turns into the standby mode. If you want to continue watching the TV, press any button or control on the TV or remote commander.

Setting the Sleep Timer

You can set the TV to turn off automatically after the period of time you want.

Press SLEEP.



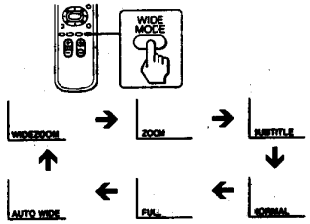
To cancel the Sleep Timer, press SLEEP repeatedly until "SLEEP TIMER: OFF" appears, or turn the TV off.

Watching the picture in wide mode (WIDE MODE)

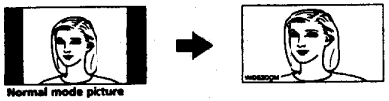
The WIDE MODE feature allows you to watch a variety of wide mode pictures.

You can select the wide picture modes using the button on the remote commander or the menu.

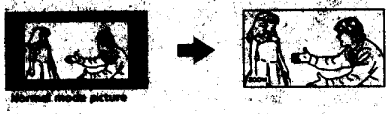
Press WIDE MODE repeatedly until the wide picture mode you want appears on the screen.



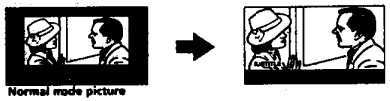
WIDEZOOM
The entire picture is enlarged to fully fit the screen. This mode is ideal for viewing a movie or a sport program.



ZOOM
The entire picture is enlarged and the edges are cut off. This mode is ideal for viewing a movie with black bands.

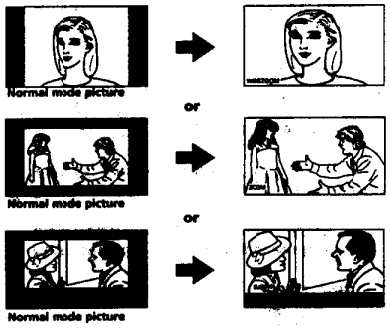


SUBTITLE
The entire picture is enlarged to fully fit the screen, and the height of the subtitle area is reduced. This mode is ideal for viewing a movie with subtitles.



FULL
The width of the picture is increased. This mode is ideal for viewing a video game screen.

AUTO WIDE
The picture mode of a TV program or a video input changes automatically to the most suitable wide mode (WIDEZOOM, ZOOM or SUBTITLE).



Notes

- If you display the PIP screen in the ZOOM mode, the bottom of the PIP screen may disappear. This does not indicate a malfunction.
- When using the AUTO WIDE function, the selected wide picture mode may not stick to a particular mode. In this case, select the wide mode you want using the WIDE MODE button.
- The AUTO WIDE function is not available for the SECAM color system.

To watch a picture in wide mode using the menu

1 Press MENU.

2 Press ↑ or ↓ to move the cursor (▶) to the FEATURES menu ( ), and press ENTER.

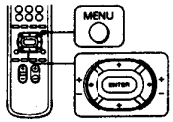
3 Make sure the cursor (▶) appears beside WIDE MODE, and press ENTER.

4 Press ←/→/↑/↓ to select the wide picture mode you want, and press ENTER.

5 Press MENU to return to the normal screen.

Scrolling a picture up or down (SCROLL)

The SCROLL feature allows you to scroll a picture up or down to view the hidden picture at the top or the bottom of the TV screen when watching a wide mode picture.
You can use the scroll feature when displaying the picture in the ZOOM or SUBTITLE mode.



1 Press MENU.

2 Press ↑ or ↓ to move the cursor (▶) to the FEATURES menu ( ), and press ENTER.

3 Press ↑ or ↓ to move the cursor (▶) to SCROLL, and press ENTER.

4 Press ↑ or ↓ to select the most suitable scroll position, and press ENTER.

SCROLL:

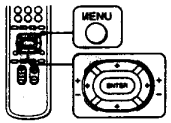
-5 ← -4 ← -3 ← -2 ← -1 ← 0 → +1 → +2 → +3 → +4 → +5
Press ↑ Press ↓

Note

- If you scroll the picture with the PIP screen in the ZOOM or SUBTITLE mode, the bottom of the PIP screen may disappear. This does not indicate a malfunction.

Adjusting the picture and sound

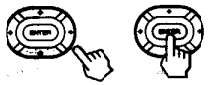
Selecting the picture and sound modes



1 Press MENU.

2 Make sure the cursor (▶) appears in the A/V CONTROL menu (📷), and press ENTER.

3 Press ↑ or ↓ to move the cursor (▶) to DYNAMIC, STANDARD, SOFT, or PERSONAL, and press ENTER.



Select	To
DYNAMIC	Receive high contrast picture with powerful sound.
STANDARD	Receive normal contrast picture with medium listening sound.
SOFT	Receive mild picture with soft sound.
PERSONAL	Receive the last picture and sound settings that are adjusted using VIDEO ADJUST and AUDIO ADJUST.

4 Press MENU to return to the normal screen.

Adjusting the picture settings (VIDEO ADJUST)

You can adjust the picture settings to suit your taste with the VIDEO ADJUST option. The adjusted settings are stored in the PERSONAL option.

1 Press MENU.

2 Make sure the cursor (▶) appears in the A/V CONTROL menu (📷), and press ENTER.

3 Press ↑ or ↓ to move the cursor (▶) to VIDEO ADJUST, and press ENTER.

4 Press ↑ or ↓ to move the cursor (▶) to the item you want to adjust, and press ENTER.

5 Press ↑/→/↓/← to adjust the selected item, and press ENTER.

For details on each item, see "Description of adjustable items" below.

6 To adjust other items, repeat steps 4 and 5.

7 Press MENU to return to the normal screen.

Description of adjustable items

Item	Press ↑/←	Press ↓/→
PICTURE	Decrease picture contrast.	Increase picture contrast.
COLOR	Decrease color intensity.	Increase color intensity.
BRIGHT	Darken the picture.	Brighten the picture.
HUE	Make picture tones become reddish.	Make picture tones become greenish.
SHARP	Soften the picture.	Sharpen the picture.
VM	Decrease emphasis on picture edges.	Increase emphasis on picture edges.

Note
- You can adjust HUE for the NTSC system only.

If the picture is slightly snowy
You may try to improve the picture by changing the VM setting as described below:

1 Display the VIDEO ADJUST menu.
2 Press ↑ or ↓ to move the cursor (▶) to VM, and press ENTER.
3 Press ↑/→/↓/← to select LOW, and press ENTER.

If the picture color is abnormal when receiving programs through the 📡 (antenna) terminal
Change the color system or the TV system from the PRESET menu as described below until the color becomes normal.

1 Display the PRESET menu.
2 Press ↑ or ↓ to move the cursor (▶) to COL SYS or TV SYS, and press ENTER.
3 Press ↑/→/↓/← to change the color system or the TV system until the color becomes normal, and press ENTER.

Note
- Normally set the color system (COL SYS) to AUTO.

Adjusting the sound settings (AUDIO ADJUST)

You can adjust the sound settings to suit your taste with the AUDIO ADJUST option. The adjusted settings are stored in the PERSONAL option.

1 Press MENU.

2 Make sure the cursor (▶) appears in the A/V CONTROL menu (📷), and press ENTER.

3 Press ↑ or ↓ to move the cursor (▶) to AUDIO ADJUST, and press ENTER.

4 Press ↑ or ↓ to move the cursor (▶) to the item you want to adjust, and press ENTER.

5 Press ↑/→/↓/← to adjust the selected item, and press ENTER.

For details on each item, see "Description of adjustable items" below.

6 To adjust other items, repeat steps 4 and 5.

7 Press MENU to return to the normal screen.

Description of adjustable items

Item	Press ↑/←	Press ↓/→
BASS	Decrease the bass sound.	Increase the bass sound.
TREBLE	Decrease the treble sound.	Increase the treble sound.
BALANCE	Increase the left speaker's volume	Increase the right speaker's volume.

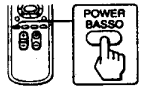
If the sound is distorted or noisy when receiving programs through the 📡 (antenna) terminal
Change the TV system from the PRESET menu as described below until the sound becomes normal.

1 Display the PRESET menu.
2 Press ↑ or ↓ to move the cursor (▶) to TV SYS, and press ENTER.
3 Press ↑/→/↓/← to change the TV system until the sound becomes normal, and press ENTER.

Listening to the POWER BASSO sound

The POWER BASSO sound enables you to enjoy a high quality sound mode with the best combination of all types of sound. It reproduces dynamic and clear sounds and emphasizes low and high audio effects as well.

Press POWER BASSO.



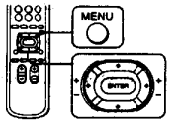
The sound mode of the TV program or the video input changes to the POWER BASSO sound.

To restore the previous sound mode
Press POWER BASSO again.

Note
- You can select any of the surround sound modes (HYPER SURROUND) to cancel the POWER BASSO sound.

Listening to the surround sound (HYPER SURROUND)

The HYPER SURROUND feature enables you to enjoy a surround sound effect that is like being in a concert hall or movie theater when receiving stereo signals.

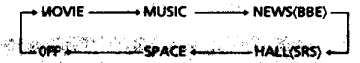


1 Press MENU.

2 Press ↑ or ↓ to move the cursor (▶) to the FEATURES menu ( ), and press ENTER.

3 Press ↑ or ↓ to move the cursor (▶) to HYPER SURROUND, and press ENTER.

4 Press ↑/↓/←/→ to select MOVIE, MUSIC, NEWS(BBE), HALL(SRS), or SPACE, and press ENTER.



For details on each item, see "Description of adjustable items" below.

5 Press MENU to return to the normal screen.

Description of adjustable items

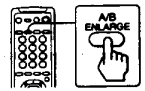
Select	To
MOVIE	Listen to a sound that emphasizes the bass audio effect of movie theater.
MUSIC	Listen to a dynamic and clear sound that emphasizes the low and high audio effect.
NEWS(BBE)	Listen to a sound that emphasizes voice.
HALL(SRS)	Listen to a sound that spreads out over a large area, giving the feeling of being at a concert hall.
SPACE	Listen to a monaural sound that gives a stereo-like effect.
OFF	Turn off the surround sound.

Notes
- The BBE is manufactured by Sony Corporation under license from BBE Sound, Inc. It is covered by U.S. Patent No. 4,638,258 and No. 4,482,866. The word "BBE" and the BBE symbol are the trademarks of BBE Sound, Inc.
- The (●)Ⓡ SRS (SOUND RETRIEVAL SYSTEM) is manufactured by Sony Corporation under license from SRS Labs, Inc. It is covered by U.S. Patent No. 4,748,669. The word "SRS" and the SRS symbol (●) are registered trademarks of SRS Labs, Inc.

Selecting a stereo or bilingual program

You can enjoy stereo sound or bilingual programs of NICAM and A2 (German) stereo systems.

Press A/B/ENLARGE repeatedly until you receive the sound you want.
The on-screen display changes corresponding to the selected sound and the STANDBY/STEREO/WAKE UP indicator also lights up.



When receiving a NICAM program

Broadcasting	On-screen display (Selected sound)
NICAM stereo	NICAM (Stereo sound) → MONO (Regular sound)
NICAM bilingual	NICAM MAIN (Main sound) → NICAM SUB (Sub sound) → MONO (Regular sound)
NICAM monaural	NICAM MAIN (Main sound) → MONO (Regular sound)

When receiving an A2 (German) program

Broadcasting	On-screen display (Selected sound)
A2 (German) stereo	STEREO (Stereo sound)
A2 (German) bilingual	MAIN (Main sound) → SUB (Sub sound)

Receiving area for NICAM and A2 (German) programs

System	Receiving area
NICAM	Hong Kong, Singapore, New Zealand, etc.
A2 (German)	Australia, Malaysia, Thailand, etc.

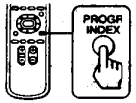
Notes
- If the signal is very weak, the sound becomes monaural automatically.
- If the stereo sound is noisy when receiving a NICAM program, select "MONO." The sound becomes monaural, however, the noise will be reduced.

Viewing multiple programs at the same time (PROGRAM INDEX)

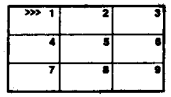
The PROGRAM INDEX feature allows you to view all the preset TV programs and the video inputs on the nine sub screens within the main screen at the same time.

You can view multiple programs on the nine sub screens using the button on the remote commander or the menu.

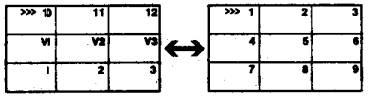
Press PROGR INDEX.



The first nine preset programs appear on the nine sub screens.



To view the next or the previous nine preset programs on the nine sub screens
Press PROGR +/– on the remote commander or the TV.



To select the program you want to watch directly after viewing multiple programs on the nine sub screens
Press the number buttons, VIDEO/HOLD, or press ↑/←/↓/→ to move the cursor (>>>) that appears on the first screen to the screen of the program you want to watch, and press ENTER.

To restore the normal screen
Press PROGR INDEX again or PIP.
You can also select PROGR INDEX or PIP : OFF from the PIP menu, and press ENTER to restore the normal screen.

To view multiple programs on the nine sub screens using the menu

1 Press MENU.

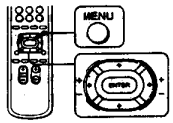
2 Press ↑ or ↓ to move the cursor (▶) to the PIP menu (), and press ENTER.

3 Make sure the cursor (▶) appears beside PROGR INDEX, and press ENTER.

Notes
- You can change the position of the nine sub screens using the PIP menu (as described in "Changing the position of the PIP screen" on page 25).
- You can hear the sound of the main screen when viewing multiple programs on the nine sub screens.
- You can use the number buttons on the remote commander to change the program position of the main screen when viewing multiple programs on the nine sub screens.

Displaying frame-by-frame pictures (STROBE)

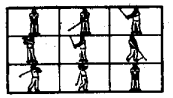
You can watch a slow motion movement of the main screen picture which is displayed frame-by-frame on the nine sub screens within the main screen.



1 Press MENU.

2 Press ↑ or ↓ to move the cursor (▶) to the PIP menu (⧉), and press ENTER.

3 Press ↑ or ↓ to move the cursor (▶) to STROBE, and press ENTER.



To restore the normal screen

Select STROBE again or PIP : OFF from the PIP menu, and press ENTER.

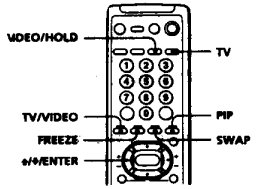
You can also press TV, VIDEO/HOLD, PROGR +/–, or PIP to restore the normal screen.

Notes

- You can change the position of the nine sub screens using the PIP menu (as described in "Changing the position of the PIP screen" on page 25).
- You can hear the normal sound when using the STROBE feature.

Using the Picture-in-Picture (PIP) features

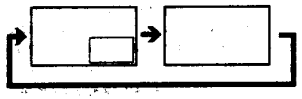
With the Picture-in-Picture (PIP) feature, you can display a sub screen within the main picture of different TV programs or video inputs.



Displaying the PIP screen

You can display the PIP screen using the button on the remote commander or the menu.

Press PIP.



Selecting a TV program or video input in the PIP screen

To select a TV program, press ↑ or ↓, and press ENTER.

To select a video input, press TV/VIDEO.

To display the PIP screen using the menu

1 Press MENU.

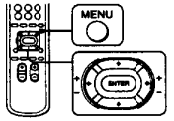
2 Press ↑ or ↓ to move the cursor (▶) to the PIP menu (⧉), and press ENTER.

3 Press ↑ or ↓ to move the cursor (▶) to PIP, and press ENTER.

4 Press ↑/↓/←/→ to select ON, and press ENTER.

5 Press MENU to return to the normal screen.

Changing the position of the PIP screen

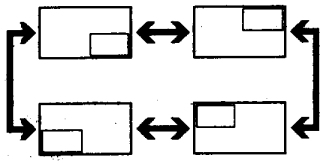


1 Press MENU.

2 Press ↑ or ↓ to move the cursor (▶) to the PIP menu (⧉), and press ENTER.

3 Press ↑ or ↓ to move the cursor (▶) to POSITION, and press ENTER.

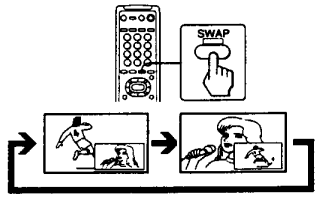
4 Press ↑/↓/←/→ to select the position you want, and press ENTER.



5 Press MENU to return to the normal screen.

Swapping pictures between the main and PIP screens

Press SWAP.



Freezing the PIP screen

Press FREEZE.

The PIP screen will freeze.

To restore the normal screen

Press FREEZE again.

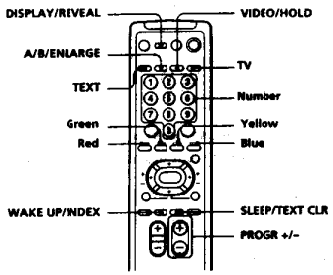
Notes

- When you display a video input on the PIP screen at an abnormal speed the picture may be noisy depencing on the VCR.
- If you display different color systems on the main screen and the PIP screen, the size of the PIP screen may be different and the PIP picture may be noisy. This does not indicate a malfunction of the TV.

Viewing Teletext

■ ***KV-V28MN11 only***

TV stations broadcast an information service called Teletext via a TV channel.
Teletext service allows you to receive various information such as weather forecasts or news at any time.



Displaying Teletext

1 Select a TV channel that carries the Teletext broadcast you want to watch.

2 Press TEXT to display the Teletext.
A Teletext page (normally the index page) is displayed. If there is no Teletext broadcast, "100" is displayed at the top left corner of the screen.

To turn off Teletext
Press TV.

Superimposing a Teletext page on the TV picture

Press TEXT.
Each time you press TEXT, the screen changes as follows:

→ Teletext → Teletext and TV → TV →

Checking the contents of a Teletext service (INDEX)

Press WAKE UP/INDEX to display an overview of the Teletext contents and page numbers.

Using FASTEXT

This feature allows you to quickly access a Teletext page that uses FASTEXT. When a FASTEXT page is broadcasted, the colored-menus appear at the bottom of the screen. The colors of the menus correspond to the red (TV/VIDEO), green (FREEZE), yellow (SWAP), and blue (PIP) color-coded buttons on the remote commander.

To access a FASTEXT menu
Press the color-coded button on the remote commander that corresponds to the colored menu which appears at the bottom of the screen. The menu page appears on the screen after several seconds.

Selecting a Teletext page

Press the number buttons to enter the three-digit page number of the Teletext page you want.
If you make a mistake, re-enter the correct page number

To access the next or previous page
Press PROGR +/–.

You can also access a Teletext page of any page numbers that appear in the colored column at the bottom of the screen using the corresponding color-coded button on the remote commander.

Holding a Teletext page (HOLD)

A Teletext page may consist of several subpages. You can stop the page scrolling in order to read the text at your own pace.

Press VIDEO/HOLD.
The HOLD symbol "⏸" appears at the top left corner of the screen.

To resume normal Teletext operation
Press VIDEO/HOLD again or TEXT

Revealing concealed information (REVEAL)

The REVEAL option lets you disclose concealed information, such as an answer to a quiz that you find on some of the Teletext pages.

Press DISPLAY/REVEAL.

To conceal the information
Press DISPLAY/REVEAL again.

Enlarging the Teletext display (ENLARGE)

Press A/B/ENLARGE.
Each time you press A/B/ENLARGE, the Teletext display changes as follows:

→ Enlarge upper half → Enlarge lower half →
Normal size ←

Waiting for a Teletext page while watching a TV program (TEXT CLEAR)

1 Key in the page number of the Teletext that you want to refer, then press SLEEP/TEXT CLR.

2 When the page number is displayed on the screen, press TEXT to turn on the Teletext.

Displaying Teletext on the PIP screen (PIP TEXT)

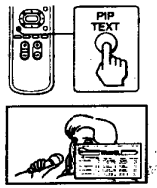
■ ***KV-V28MN11 only***

The PIP TEXT feature enables you to display a Teletext page on the PIP screen while watching a TV program.

You can display the Teletext on the PIP screen using the button on the remote commander or the menu.

1 Select a TV channel that carries the Teletext broadcast you want to watch.

2 Press PIP TEXT.

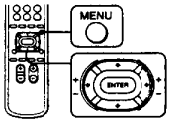


To restore the normal screen

Press PIP TEXT again, TV, VIDEO/HOLD, or PROGR +/–.

You can also select PIP : OFF from the PIP menu, and press ENTER to restore the normal screen.

To display a Teletext page on the PIP screen using the menu



1 Press MENU.

2 Press ↑ or ↓ to move the cursor (▶) to the PIP menu ( ), and press ENTER.

3 Press ↑ or ↓ to move the cursor (▶) to PIP TEXT, and press ENTER.

4 Press ↑/↓/←/→ to select the Teletext page you want to watch.

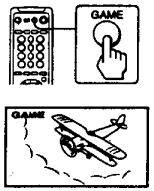
Notes

- You can also use the color-coded buttons (see page 26) while displaying a Teletext page on the PIP screen.
- To select a Teletext page on the PIP screen, press ↑/↓/←/→ once only.
  If you press ↑/↓/←/→ continuously, the Teletext page numbers also change continuously at a fast speed.
- You can change the position of a Teletext page on the PIP screen using the PIP menu (as described in "Changing the position of the PIP screen" on page 25).

Viewing a video game screen

You can view a video game screen in the optimum mode that gives soft picture and dynamic sound effect.

Press GAME.



The picture and sound change to the mode that is suitable for a video game.

To restore the normal picture and sound mode

Press TV, VIDEO/HOLD, or PROGR +/–.

Notes

- If you press the GAME button when the TV is in the standby mode, the TV turns on automatically and the picture and sound change to the mode that is suitable for a video game.
- To display a video game screen, connect the video game equipment to the VIDEO 3 INPUT jacks at the front of the TV or the VIDEO IN 3 jacks at the rear of the TV.

Customizing the TV

Using the AV OUT (advanced rec-out) terminal

You can select the output signal from the MON/TV OUT jacks at the rear of the TV. However, the signals of the PROGRAM INDEX, STROBE, PIP modes, and the Teletext broadcast (for KV-V28MN11 only) cannot be output even though MONITOR is selected.

1 Press MENU.

2 Press ↑ or ↓ to move the cursor (▶) to the FEATURES menu (), and press ENTER.

3 Press ↑ or ↓ to move the cursor (▶) to AV OUT, and press ENTER.

4 Press ↑/↓/←/→ to select the output signal, and press ENTER.

Select	To
TV	Output the signal of the TV broadcast.
MONITOR	Output the signal of the picture you are watching as a main picture.

Note

- Do not change the channel while recording with a VCR through the MON/TV OUT jacks. If you change the channel, it also changes the channel you are recording.

Adjusting the picture tilt

You can adjust the picture tilt if it is not aligned to the TV screen. This may happen due to the direction of the earth's magnetic fields in relation to the TV position.

1 Press MENU.

2 Make sure the cursor (▶) appears in the A/V CONTROL menu (), and press ENTER.

3 Press ↑ or ↓ to move the cursor (▶) to TILT CORRECT, and press ENTER.

4 Press ↑/↓/←/→ to select the most suitable value to adjust the picture tilt, and press ENTER.

TILTCORRECT:

-5 ← -4 ← -3 ← -2 ← -1 ← 0 → +1 → +2 → +3 → +4 → +5

Press ↑/↓ Press ←/→

Troubleshooting

If you have any problems, read this manual again and check the countermeasure for each of the symptoms listed below.
If the problem persists, contact your nearest Sony dealer or authorized service center.

Snowy picture
Noisy sound

➡ Check the antenna.
➡ Check the antenna connection on the TV and on the wall.
➡ Check the TV system (TV SYS) setting.
➡ Check the ATT (attenuator) setting.

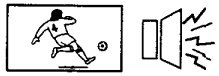
Dotted lines or stripes

➡ This may be caused by local interference (e.g. cars, neon signs, hair dryers, etc.). Adjust the antenna for minimum interference.

Double images or "ghosts"

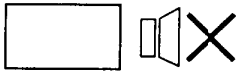
➡ This may be caused by reflections from nearby mountains or buildings. A highly directional antenna may improve the picture.

Good picture
Noisy sound



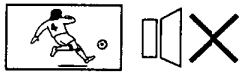
➡ Check the TV system (TV SYS) setting.

No picture
No sound



➡ Press POWER.
➡ Press POWER to turn off the TV for about five seconds and then turn it on again.
➡ Check the power cord connection.
➡ Check the antenna connection.
➡ Check the VCR connections.

Good picture
No sound



➡ Press VOL +.
➡ Press MUTING.
➡ Press A/B/ENLARGE.

No color

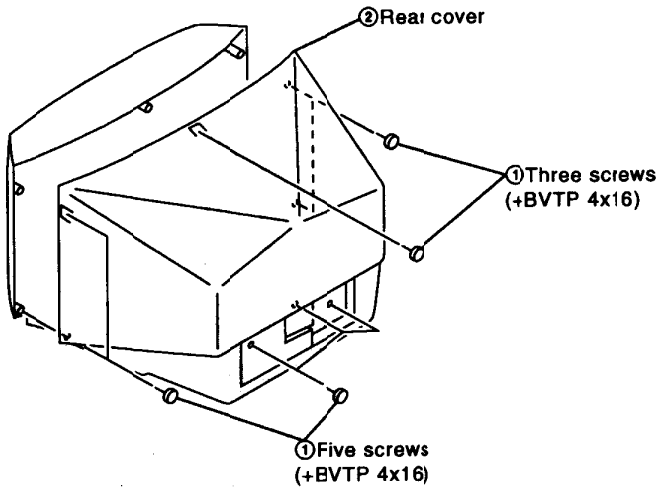
➡ Adjust the COLOR level in the VIDEO ADJUST menu of the PERSONAL option.
➡ Check the color system (COL SYS) setting.

TV cabinet creaks

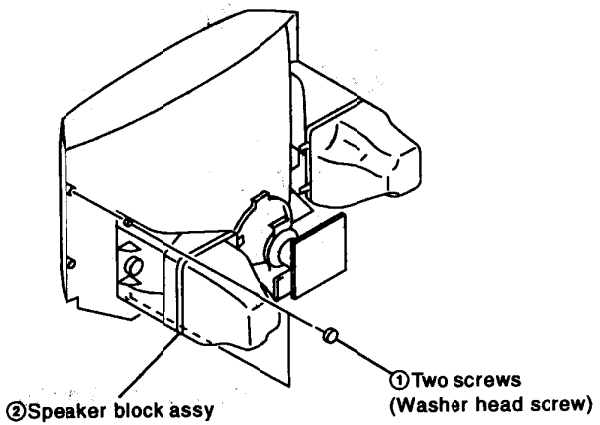
➡ Even if the picture or the sound is normal, changes in the room temperature sometimes make the TV cabinet expand or contract, making a noise. This does not indicate a malfunction.

SECTION 2
DISASSEMBLY

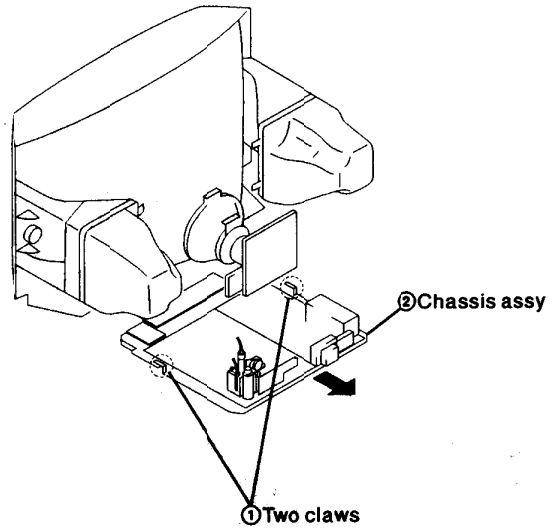
2-1. REAR COVER REMOVAL



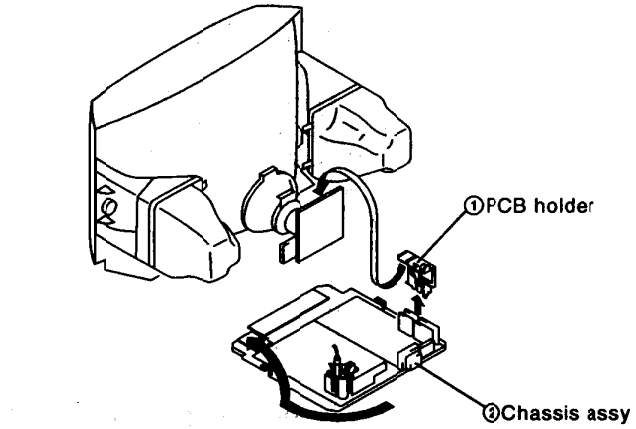
2-2. SPEAKER REMOVAL

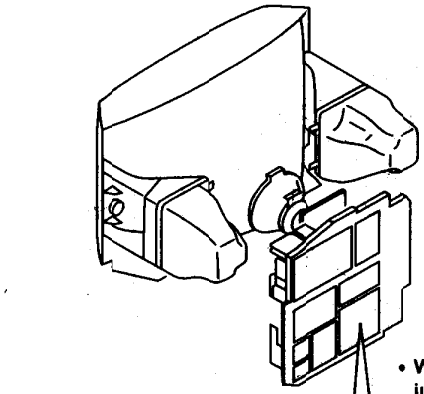


2-3. CHASSIS ASSY REMOVAL



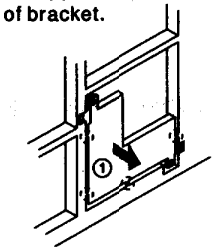
2-4. SERVICE POSITION





• When measuring the power supply voltage, just remove a part of bracket shown below.

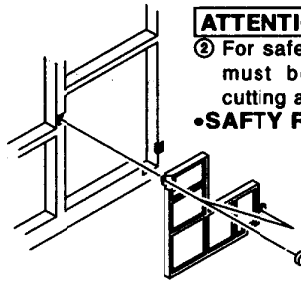
① Cut the four marked sections with a nippers to remove a part of bracket.



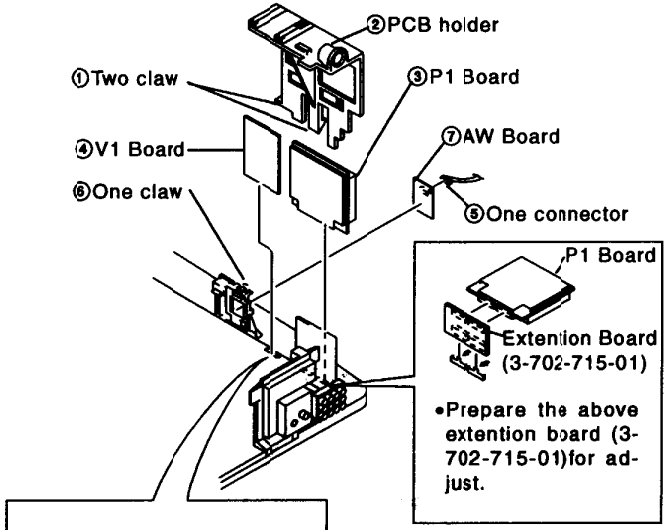
ATTENTION

② For safety reason this plate must be remounted after cutting and taking away.

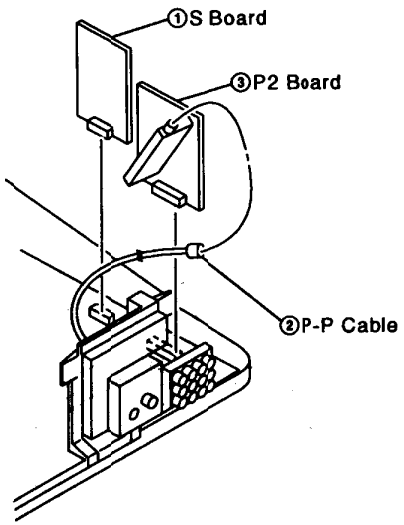
•SAFTY REQUIREMENT



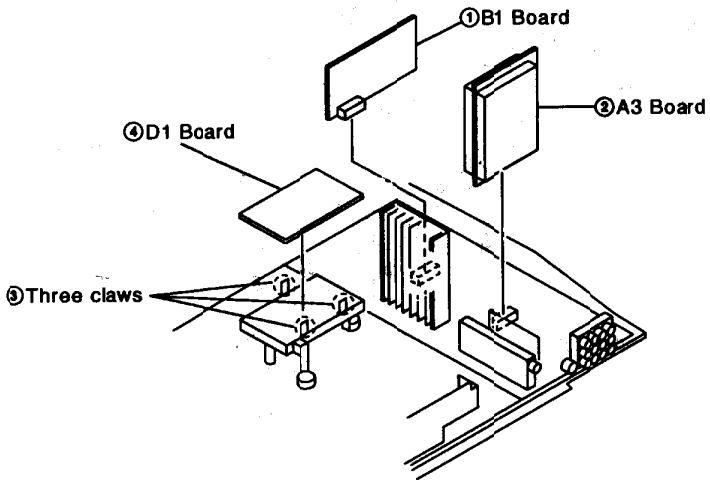
2-5. AW, P1 AND V1 BOARDS REMOVAL



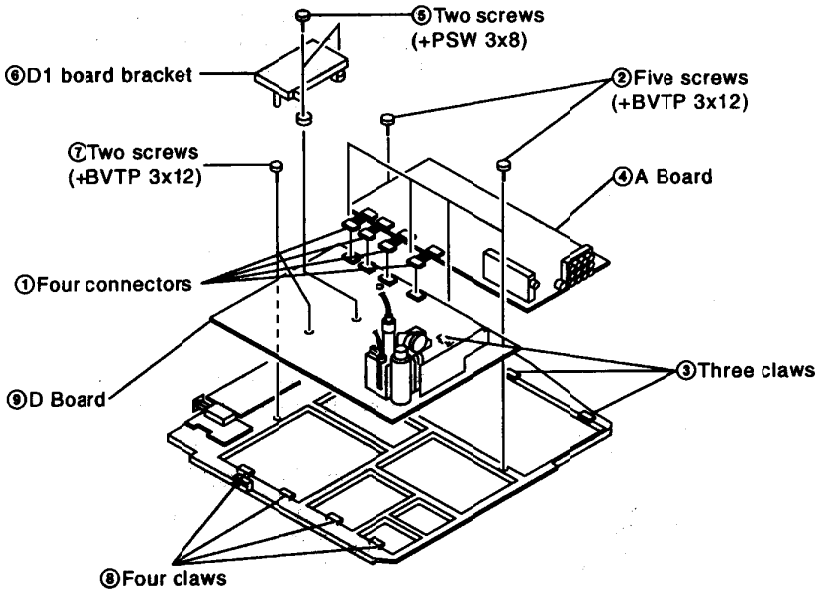
2-6. P2 AND S BOARDS REMOVAL



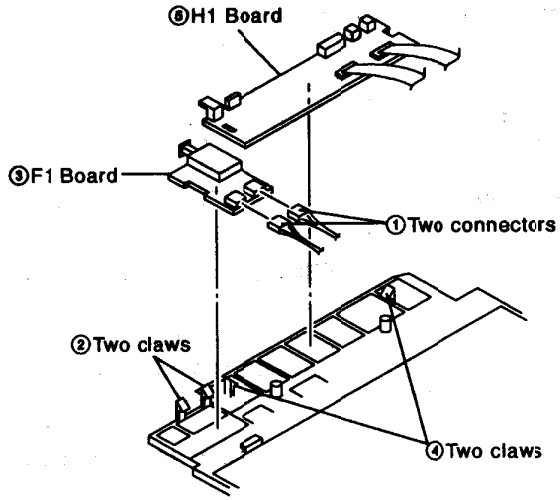
2-7. A3, B1 AND D1 BOARDS REMOVAL



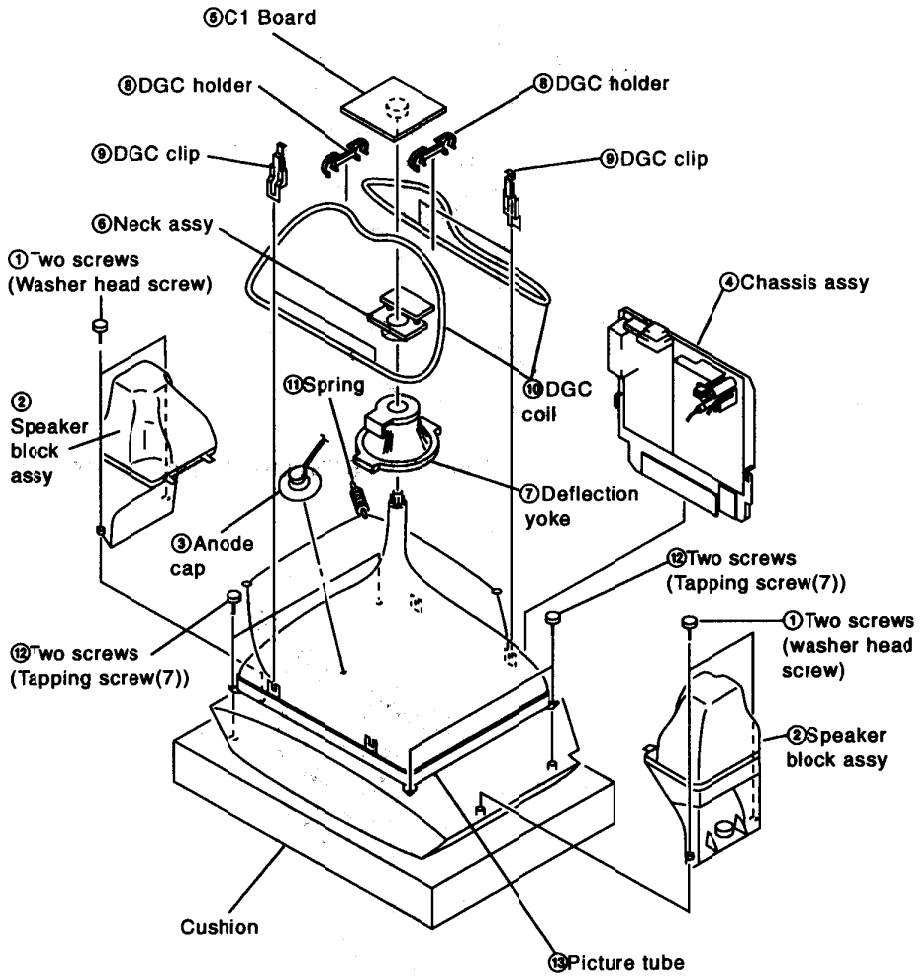
2-8. A AND D BOARDS REMOVAL



2-9. F1 AND H1 BOARDS REMOVAL



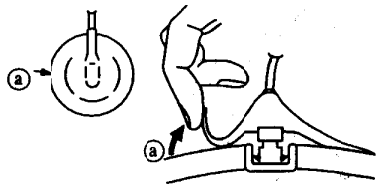
2-10. PICTURE TUBE REMOVAL



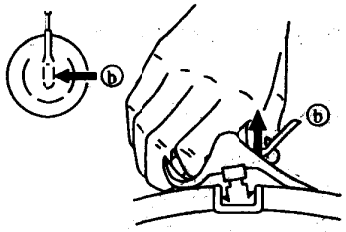
• REMOVAL OF ANODE-CAP

NOTE : Short circuit the anode of the picture tube and the anode cap to the metal chassis, CRT shield or carbon paint or the CRT, after removing the anode.

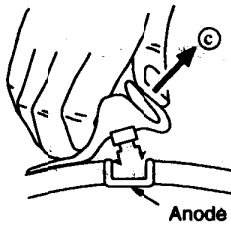
• REMOVING PROCEDURES



① **Turn up one side of the rubber cap in the direction indicated by the arrow ⓐ.**



② **Using a thumb pull up the rubber cap firmly in the direction indicated by the arrow ⓑ.**



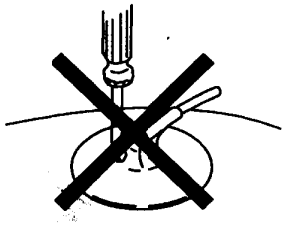
③ **When one side of the rubber cap is separated from the anode button, the anode-cap can be removed by turning up the rubber cap and pulling it up in the direction of the arrow ⓒ.**

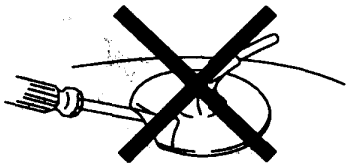
• HOW TO HANDLE AN ANODE-CAP

① **Don't hurt the surface of anode-caps with sharp shaped objects!**

② **Don't press the rubber too hard so as not to hurt inside of anode-caps!**
A metal fitting called the shatter-hook terminal is built into the rubber.

③ **Don't turn the foot of rubber over too hard!**
The shatter-hook terminal will stick out or damage the rubber.





SECTION 3
SET-UP ADJUSTMENTS

- The following adjustments should be made when a complete realignment is required or a new picture tube is installed.
- These adjustments should be performed with rated power supply voltage unless otherwise noted.

Controls and switch should be set as follows unless otherwise noted:
PICTURE control ..... RESET
BRIGHTNESS control ..... CENTER

Perform the adjustments in order as follows :

1. Beam Landing
2. Convergence
3. Focus
4. White Balance

Note : Test Equipment Required.

1. Color-bar/Pattern Generator
2. Degausser
3. Oscilloscope

Preparations :

- In order to reduce the influence of geomagnetism on the set's picture tube, face it east or west.
- Switch on the set's power and degauss with the degausser.

3-1. BEAM LANDING

1. Input a white signal with the pattern generator.
   Contrast } normal
   Brightness }
2. Position neck ass'y as shown in Fig3-2.
3. Set the pattern generator raster signal to a red raster.
4. Move the deflection yoke to the rear and adjust with the purity control so that the red is at the center and the blue and the green take up equally sized areas on each side.
   (See Figures 3-1 through 3-3.)
5. Move the deflection yoke forward and adjust so that the entire screen is red. (See Figure 3-1.)
6. Switch the raster signal to blue, then to green and verify the condition.
7. When the position of the deflection yoke has been decided, fasten the deflection yoke with the screws and DY spacers.
8. If the beam does not land correctly in all the corners, use a magnet to adjust it.
   (See Figure 3-4.)

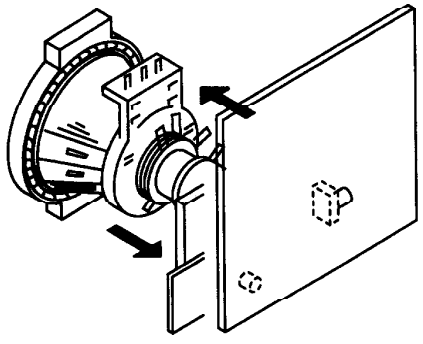


Fig. 3-1

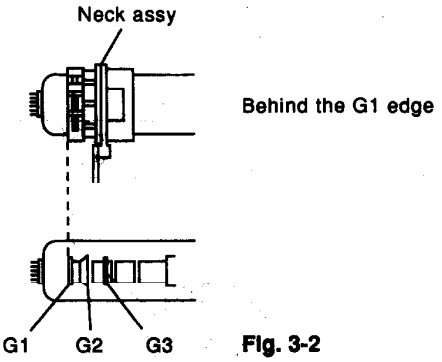


Fig. 3-2

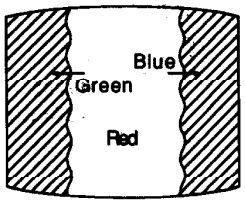


Fig. 3-3

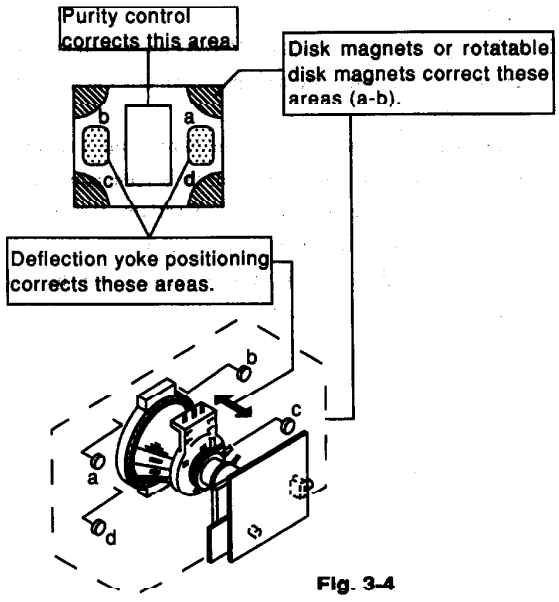


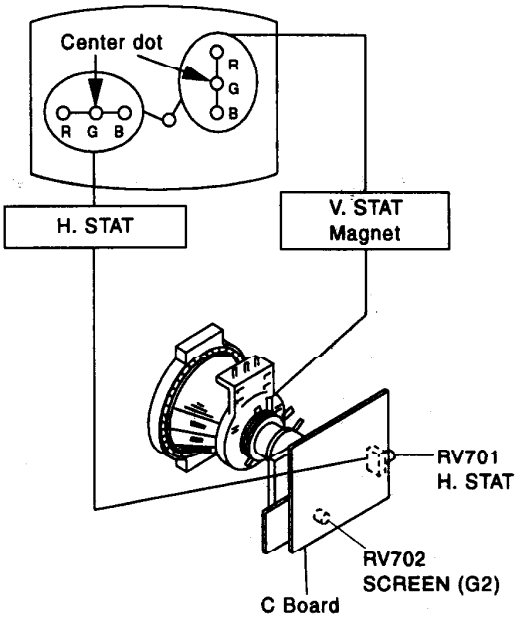
Fig. 3-4

3-2. CONVERGENCE

Preparations :

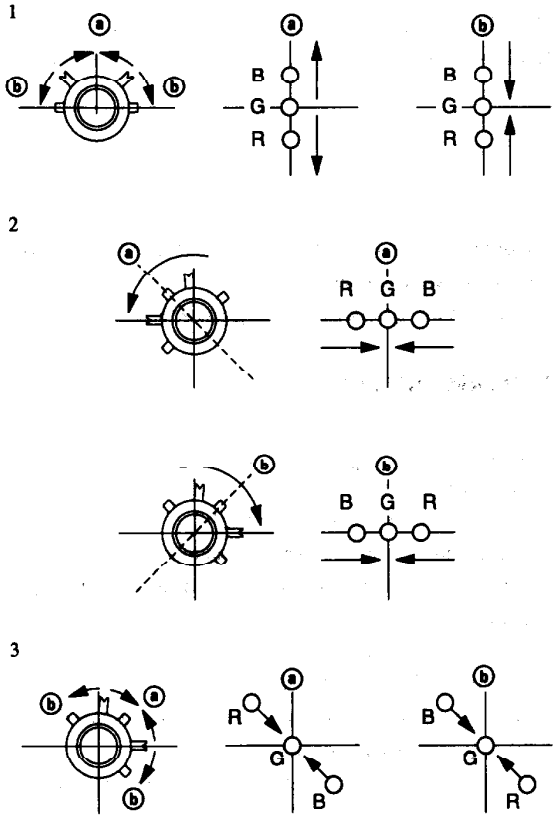
- Before starting this adjustment, adjust the focus, horizontal size and vertical size.
- Minimize the brightness setting.
- Provide dot pattern.

(1) Horizontal and Vertical Static Convergence

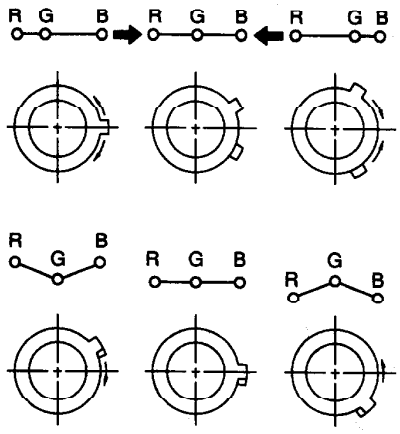


1. (Moving horizontally), adjust the H.STAT control so that the red, green and blue points are on top of each other at the center of the screen.
2. (Moving vertically), adjust the V.STAT magnet so that the red, green and blue points are on top of each other at the center of the screen.
3. If the H.STAT variable resistor cannot bring the red, green and blue points together at the center of the screen, adjust the horizontal convergence with the H.STAT variable resistor and the V.STAT magnet in the manner given below.
   (In this case, the H.STAT variable resistor and the V.STAT magnet influence each other.)

- Tilt the V.STAT magnet and adjust the static convergence by opening or closing the V.STAT magnet.
  If the V.STAT magnet is moved in the direction of the ⓐ and ⓑ arrows, the red, green, and blue points move as shown below.



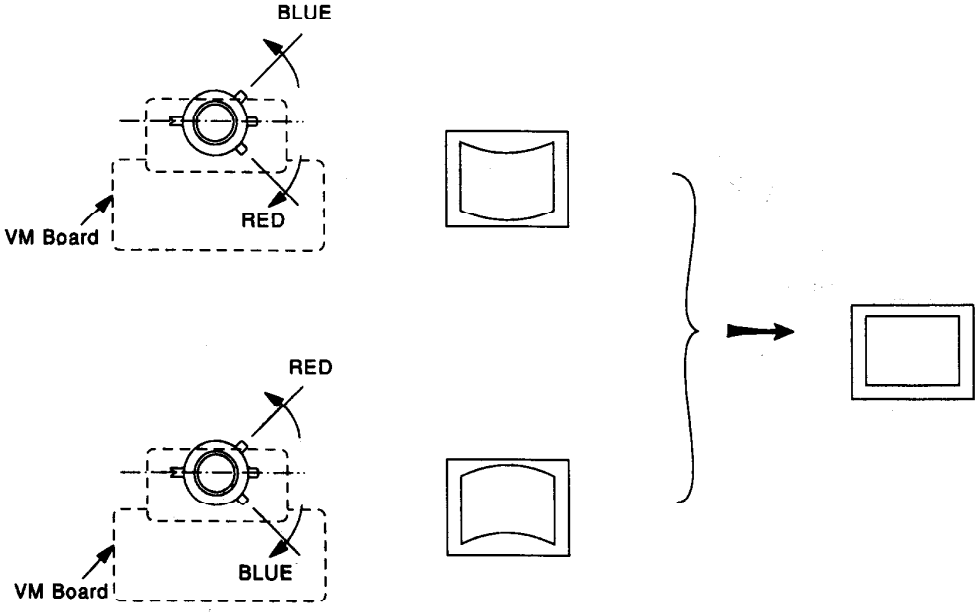
- Operation of BMC (Hexapole) Magnet
  If the red, green and blue dots are not balanced or aligned, then use the BMC magnet to adjust in the manner described below.



- Use the H.STAT VR to adjust the red, green, and blue dots so that they coincide at the center of screen.
  The respective dot position resulting from moving each magnet interact, so be sure to perform adjustment while tracking.

1 Y separation axis correction magnet adjustment receive the cross-hatch signal and adjust [PICTURE] to [MIN] and [BRIGHTNESS] to [STANDARD] .

2 Adjust the Y separation axis correction magnet on the neck assembly so that the horizontal lines at the top and bottom of the screen are straight.



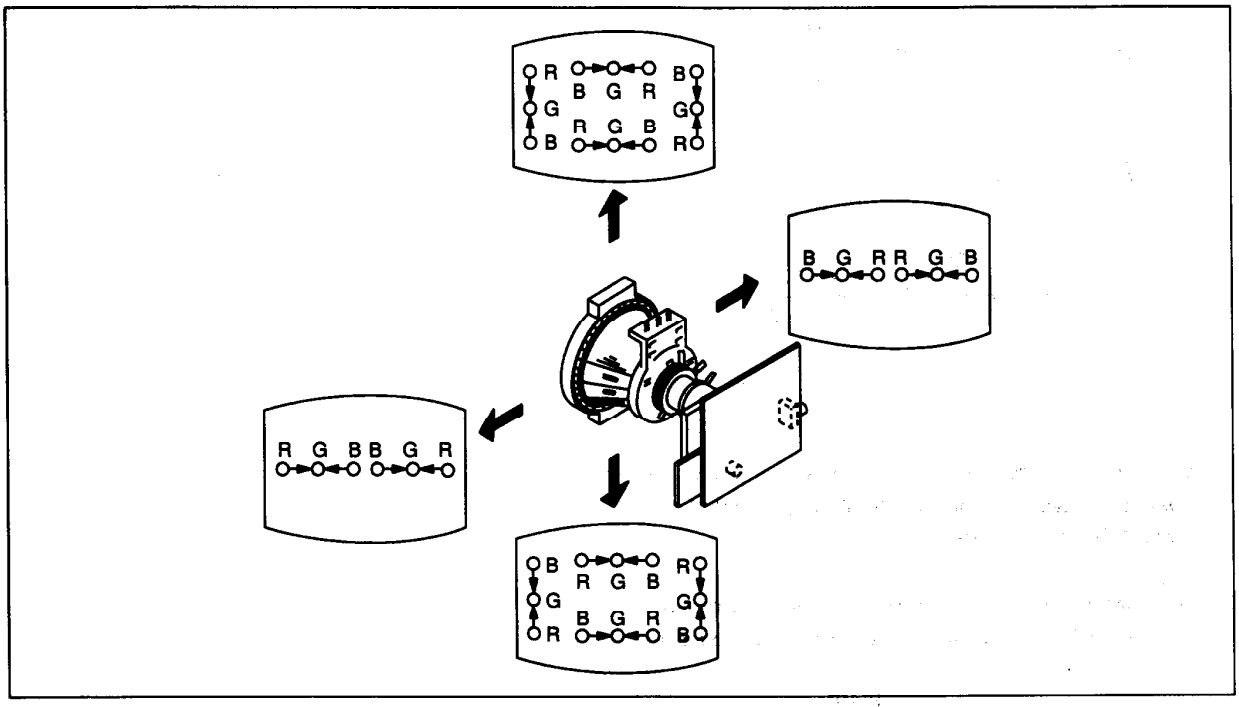
Note 1) The Red and Blue magnets should be equally far from the horizontal center line.
2) Do not seperate the Red and Blue magnets too far. (Less than 8 mm)

(2) Dynamic Convergence Adjustment

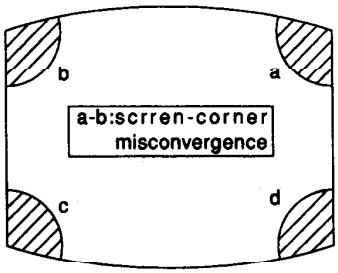
Preparation:

- Before starting this adjustment, adjust the horizontal static convergence and the vertical static convergence

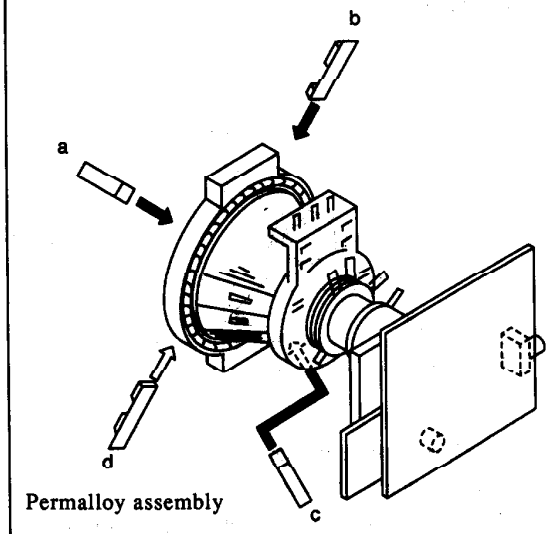
1. Slightly loosen the deflection yoke screws.
2. Remove the deflection yoke spacer.
3. Move the deflection yoke as shown in the figure below and optimize the convergence.
4. Tighten the deflection yoke screws.
5. Install the deflection yoke spacer.



(3) Screen-corner Convergence



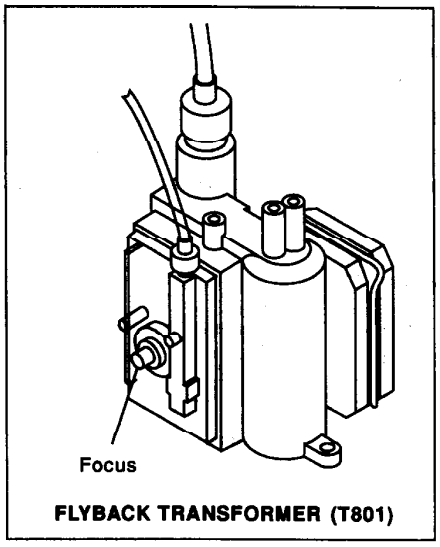
Affix a Permalloy assy corresponding to the misconverged areas.



Permalloy assembly

3-3. FOCUS ADJUSTMENT

Adjust FOCUS control on the flyback transformer for the best focus.



FLYBACK TRANSFORMER (T801)

a. AN ITEM OF ADJUSTMENT

Item number	Adjustment item	Standard DATA	Note
37	SBR	1F	SUB-BRIGHTNESS
39	GDR	2C	G. Drive
3A	BDR	2C	B. Drive
3B	GCF	07	G. CUT-OFF
3C	BCF	07	B. CUT-OFF

b. METHOD OF CANCELLATION FROM SERVICE MODE

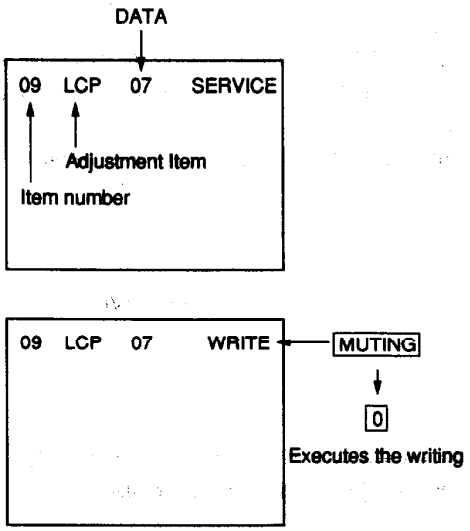
Set the standby condition (Press [POWER] button on the commander), then press [POWER] button again, hereupon it becomes TV mode.

c. METHOD OF WRITE FOR MEMORY

1) Set to Service Mode.
2) Press [1] (UP) and [4] (DOWN), select an item of adjustments.
3) Press [MUTING] button indicate WRITE on screen.
4) Press [0] button to write into memory.

d. MEMORY WRITE CONFIRMATION METHOD

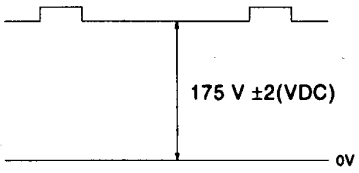
1) After adjustment, pull out the plug from AC outlet, and then plug into AC outlet again.
2) Turn the power switch ON and set to Service Mode.
3) Call the adjusted items again to confirm adjustments were made.



3-4. G2 (SCREEN) AND WHITE BALANCE ADJUSTMENTS

1. G2 (SCREEN) ADJUSTMENT (RV702)

1) Set the PICTURE and BRIGHTNESS to normal.
2) Put to VIDEO input mode without signals.
3) Set to Service Mode.
4) Change BLU data of the item number [8E] from [01] to [00]. (To turn off Blue Back.)
5) Press [MUTING], and [0] to write the data in the memory.
6) Connect R, G, and B of the C board cathode to the oscilloscope.
7) Adjust G2 (RV702) volume to the value below.



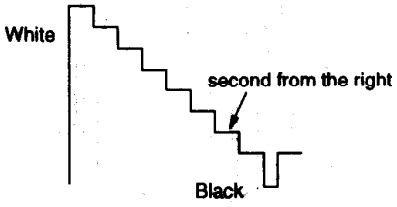
8) Re-set BLU data of the item number [8E] from [00] back to [01].
9) Press [MUTING], and [0] to write the data in the memory.

2. WHITE BALANCE ADJUSTMENTS

1) Set to service Mode.
2) Input white raster signal.
3) Set the PICTURE to minimum.
4) Select SBR(37) with [1] and [4], and then set the level to minimum with [3] and [6].
5) Select GCF(3B) and BCF(3C) with [1] and [4]. And adjust the level with [3] and [6] for the best white balance.
6) Set the PICTURE to maximum.
7) Select GDR(39) and BDR (3A) with [1] and [4], and adjust the level with [3] and [6] for the best white balance.
8) Write into the memory by pressing [MUTING] then [0].

3. SUB BRIGHT ADJUSTMENT

1) Set to service mode.
2) Input a staircase signal of black and white from the pattern generator.
3) BRIGHTNESS .... RESET.
   PICTURE ..... minimum
4) Select SBR(37) with [1] and [4], and adjust SBR level with [3] and [6] so that the stripe second from the right is dimly lit.



SECTION 4
SELF DIAGNOSIS FUNCTION

When power is turned on, faifure detection is proceeded.
If any of the devices listed below fails, the LED will fliker as frequent as the corresponding device.

Board name	A Board	A Board	A Board	A Board
Ref. No.	IC003	IC1201	IC104	IC206
Device	NONVOLA-TILE MEMORY	AV SWITCH (CXA1855S)	MAIN Y/C (CXA2050S)	SURROUND PROCESSOR (TDA8424)
Flickering Frequency	1	2	3	6

If more then to devices fail, the one assigned with less flikering frequency of LED has a priority to those with more frequency.

SECTION 5
CIRCUIT ADJUSTMENTS

5-1. ADJUSTMENTS WITH COMMANDER

Service adjustments are made with the RM-872 that comes with this unit.

Entering service mode

With the unit on standby

↓

[DISPLAY]

↓

[5]

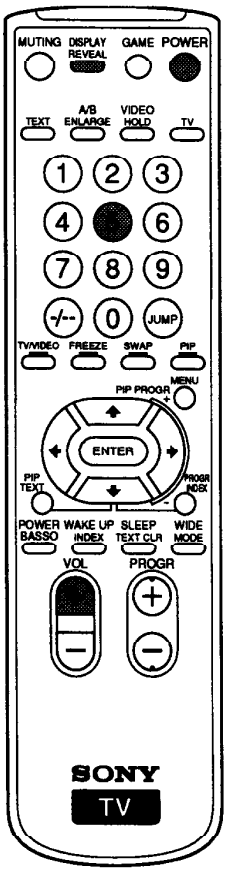
↓

[VOL (+)]

↓

[POWER]

The operation sequence puts the unit into service mode.

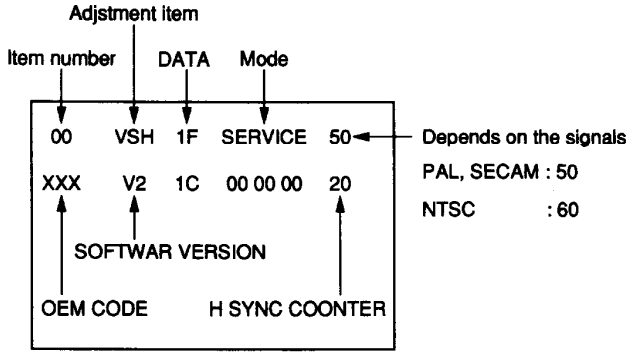


RM-872

[1], [4]	Select the adjustment item.
↓	
[3], [6]	Raise/lower the data value.
↓	
[MUTING]	Writes.
↓	
[0]	Executes the writing.

[7], [0]	All the data becomes the values in memory.
[8], [0]	All user control goes to the standard state.
[5], [0]	Service data initialization (Be sure not to use usually.)
[2], [0]	Write 50Hz adjustment data to 60Hz, or vice versa.

The screen display is :

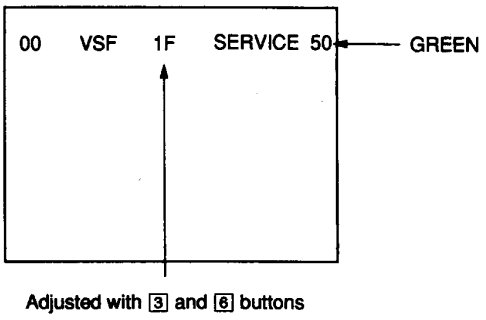


5-2. ADJUSTMENT METHOD

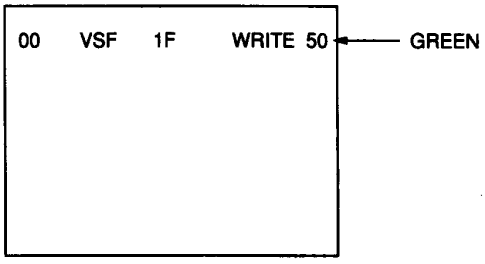
Item Number 00

This explanation uses V-Position as an example.

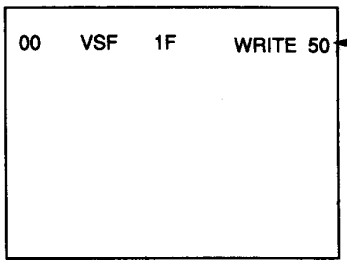
1. Select 00 VSH with the [1] and [4] buttons.
2. Raise/lower the data with the [3] and [6] buttons.
3. Select the optimum state. (The standard is IF for PAL reception.)
4. Write with the [MUTING] button. (The display changes to WRITE.)
5. Execute the writing with the [0] button. (The WRITE display will be changed back to SERVICE.)



Adjusted with [3] and [6] buttons



Written with [MUTING]



Write executed with [0]

Use the same method for Items Number 00-99. Use [1] and [4] to select the adjustment item, use [3] and [6] to adjust, write with [MUTING], then execute the write with [0].

Note : In [WRITE], the data of all items are into memory.

- As for V-FREQ, by searching the bolded screen V range with adjusting data.

Note : For adjustment Items that have differnt standard data between 50Hz or 60Hz and novwel or wid, be sure to use the respective input signal ather adjusting.

Adjustment Item Table

Item number	Adjustment Item	Data range	Standard data	NVM-Area	Note	Device
				① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩		
00	VSH	00~3F	1C	1C 1C 1C 1C 1C 1C 1C 1C 1C 1C	V Position	CXA2050S
01	VSZ	00~3F	1F	23 23 23 23 23 23 1E 1E 23 23	V Size	(Y/C/J)
02	HSH	00~0F	09	09 03 09 03 09 03 09 03 09 03	H position	SLV : 88H
03	HSZ	00~3F	1F	1C 1C 1B 1B 1B 1B 1D 1C 1B 1B	H Size	
04	SCH	00~0F	07	08 08 08 08 08 08 08 08 08 08	S Correction	
05	VLN	00~0F	07	08 08 08 08 08 08 08 08 08 08	V Linearity	
06	PAP	00~3F	1F	06 06 06 06 06 06 0B 0B 06 06	Pin Comp	
07	PPH	00~0F	07	07 07 07 07 07 07 07 07 07 07	Pin Phase	
08	UCP	00~0F	07	07 07 07 07 07 07 07 07 07 07	Up Corner Pin	
09	LCP	00~0F	07	05 05 05 05 05 05 05 05 05 05	Low Corner Pin	
0A	BOW	00~0F	07	0A 0A 0A 0A 0A 0A 0A 0A 0A 0A	AFC-Bow	
0B	ANG	00~0F	07	07 07 07 07 07 07 07 07 07 07	AFC-Angle	
0C	VAP	00~3F	2F	24 1B 26 2A 24 22 00 00 00 00	V Aspect	
0D	VSC	00~3F	1F	1D 1C 1E 1D 1E 20 1F 1E 1F 1E	V Scroll	
0E	ULN	00~0F	00	02 02 00 00 00 00 00 00 00 00	UP V Linearity	
0F	LLN	00~0F	00	04 04 00 00 00 00 00 00 00 00	LOW V Linearity	
10	EHH	00~03	00	TV : 00 TEXT / MIX : 00	EHT-H	
11	EHV	00~03	01	TV : 01 TEXT / MIX : 01	EHT-V	
12	HBS	00~01	01	01 01 01 01 01 01 01 01 01 01	H Blk Wid. ON/OFF	
13	LBK	00~0F	0F	0F 0F 0F 0F 0F 0F 08 0C 0F 0F	L Blk Width	
14	RBK	00~0F	0F	0F 0F 0F 0F 0F 0F 0A 07 0F 0F	R Blk Width	
15	JSW	00~01	00	00 00 00 00 00 00 00 00 00 00	Jump ON/OFF Sw	
16	VBW	00~03	02	02 02 02 02 02 02 02 02 02 02	V Blk Wid. Con.	
				⑪ ⑫ ⑬ ⑭ ⑮		
17	AFC	00~03	01	01 03 03 01 01	AFC-Mode	
				① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩		
18	FHH	00~01	00		FH-HI	
19	VFQ	00~03	00	00 00 00 00 00 00 00 00 00 00	V-Freq	
1A	VOF	00~01	00		V OFF	
1B	VMD	00~01	00		CD-Mode 2	
1C	CMD	00~01	00		CD-Mode	
1D	ITL	00~03	00		Interlace	
1E	ZSW	00~01	00	01 01 01 01 01 01 00 00 00 00	ZOOM SW	
1F	PCV	00~03	03		Pre-Over	
20	CT1	00~01	01		C-Trap (NTSC)	
21	CT2	00~01	01		C-Trap (PAL)	
22	CFO	00~0F	07		C-Trap f0 Adj	
23	SFO	00~01	01		Sharpness f0 Adj	
24	TOT	00~01	01		TOT Filter SW	
25	CSW	00~03	00		Color SW	
26	XTL	00~03	00		Xtal	
27	CV1	00~01	01		CV/YC Select (NTSC)	
28	CV2	00~01	01		CV/YC Select (PAL)	
29	VM	00~01	01		VM ON/OFF	
2A	YVM	00~01	00		YS1/VM SW (0 : YS1)	
2B	DPC	00~01	01		D-Pic ON/OFF	
2C	DCO	00~01	01		Dynamic Color	
2D	GMM	00~03	01		Gamma	
2E	DTR	00~01	01		DC-Tran	
2F	DL1	00~07	01	TV : 01 VIDEO : 01	Delay Ctrl. (PAL)	
30	DL2	00~07	03	TV : 03 VIDEO : 03	Delay Ctrl. (NTSC)	
31	DL3	00~07	03	TV : 03 VIDEO : 03	Delay Ctrl. (SECAM)	
32	SCN	00~0F	09		Sub-Contrast	
33	SC1	00~0F	0B		Sub-Color (OTHER)	
34	SC2	00~0F	0A		Sub-Color (NTSC)	
35	SH1	00~0F	0A		Sub-Hue (TV)	
36	SH2	00~0F	0A		Sub-Hue (VIDEO)	

Note: **Bold** items are fixed data.

Adjustment Item Table

Item number	Adjustment Item	Data range	Standard data	NVM-Area	Note	Device
				① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩		
37	SBR	00~3F	1F		Sub-Bright	CXA2050S
38	SSH	00~07	04	TV : 06 VIDEO : 03	Sub-Sharpness	(Y/C/J)
39	GDR	00~3F	2C		G-Drive	SLV : 88H
3A	BDR	00~3F	2C		B-Drive	
3B	GCF	00~0F	07		G-Cutoff	
3C	BCF	00~0F	07		B-Cutoff	
3D	HPO	00~03	01	01 02 01 02 01 02 01 02 01 02	Ref-Position	
3E	PON	00~01	01		Pic-ON	
3F	RON	00~01	01		R ON	
40	GON	00~01	01		G ON	
41	BON	00~01	01		B ON	
42	AKF	00~01	00		AKB ON/OFF SW	
43	ESY	00~01	00	TV : 00 TEXT / MIX : 00	Ext Sync Select	
44	AGG	00~01	00		Aging Mode ON/OFF	
45	ABL	00~01	01		ABL Pic/Pic & Brt SW (O : Pic only)	
46	LIM	00~01	00		RGB Limit ON/OFF (0 : ON)	
47	PB	00~01	01		Picture Booster	TDA9170
48	BOF	00~01	01		Black Offset	(Picture improve)
49	UVG	00~3F	1F		User Var. Gamma	Slv : D0H
4A	ADG	00~3F	1F		Adaptive Gamma	
4B	NLA	00~3F	0F		Non-linear Amp	
4C	WDS	00~02	00		Window select	
4D	LST	00~0F	07		Window Line Start	
4E	LSP	00~0F	07		Window Line Stop	
4F	FST	00~0F	07		Window Field Start	
50	FSP	00~0F	07		Window Field Stop	
51	VA	00~01	01		V Aperture on/ off	CXA1315
52	VAW	00~03	02		V Aperture white	(V-AP)
53	VAB	00~03	02		V Aperture black	Slv : 48H
54	VAC	00~0F	03		V Aperture core	
55	SHP	00~3F	0F		Sharpness	CXA1315
56	VDL	00~3F	29		VM Limitter	(LTI)
57	CORA	00~3F	17		Coring	Slv : 42H
58	DCOF	00~3F	15		DSC Offset	
59	DGA	00~3F	1F		DSC Gain	
5A	DLT	00~01	01		Delay Time	
5B	SDL	00~0F	01		SEL Pin Delay	SDA9189X
5C	POH	00~FF	14		H Position (MSB8bit)	(P in P)
5D	POV	00~FF	27		V Position	Slv : D6H
5E	PMD	00~1F	00	NO FUNCTION	P in P Display Mode	
5F	WRP	00~0F	00	NO FUNCTION	Write Position	
60	HDL	00~1F	0B		HSI Delay	
61	AMS	00~01	00		Decimation Filter	
62	VDL	00~1F	0B		VSI Delay	
63	VSP	00~1F	06		VSP Delay	
64	CON	00~0F	06		Contrast	
65	FRM	00~0F	09		Frame Y	
66	FRV	00~0F	00		Frame V	
67	FRU	00~0F	00		Frame U	
68	INF	00~01	01		Inner Frame	
69	FWV	00~03	02		Frame Width V	
6A	FWH	00~07	07		Frame Width H	
6B	PLL	00~03	02		PLL Loop Filter	

Note: **Bold** items are fixed data.

Adjustment Item Table

Item number	Adjustment Item	Data range	Standard data	NVM-Area ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩	Note	Device
6C	[illegible]	00~0F	00		Pedestal V	SDA9189X
6D	[illegible]	00~0F	00		Pedestal U	(P in P)
6E	[illegible]	00~01	00		DAC Stream Control	Slv : D6H
6F	DAN	00~01	00		DAC Control	
70	WIP	00~01	00		Wipe on/off	
71	WSP	00~03	00		Wipe Speed	
72	FAW	00~FF	08		NICAM FAW Thresh	MSP3410
73	CTM	00~FF	08		NICAM Error Bit (MONO)	(Stereo Decorder)
74	CTN	00~FF	50		NICAM Error Bit (NICAM)	Slv : 80H
75	WCD	00~FF	0A		W. G. DATA CHANGE	
76	WST	00~FF	15		W. G. STEREO Threshold	
77	WTM	00~FF	50		W. G. Timer	
78	WBT	00~01	EA		W. G. bilingual Threshold	
79	ACG	00~01	01		AGC AUTO/CONST	
7A	CDB	00~3F	28		AGC GAIN CONST	
7B	FGP	00~7F	24		FM (BG, I, DK) Prescale	
7C	FMP	00~7F	40		FM (M) Prescale	
7D	WGP	00~7F	3C		W. G. Prescale	
7E	[illegible]	00~7F	7F		NICAM Prescale	
7F	[illegible]	00~01	00		Carrier Mute	
80	[illegible]	00~03	00		Carrier Mute Level	
81	ACO	00~01	01		Audio Clock Out	
82	WAC	00~0F	01		W. G. Agreement count	
83	DLY	00~FF	30		Stereo Search Delay	
84	DLG	00~FF	10		W. G. Search Delay	
85	TXP	00~0F	0E		Text Picture cont.	SAA5281
86	MXP	00~0F	0F		Text Mix Mode Pic.	(Text decoder) Slv : 58H
87	BB1	00~3F	1D		BBE control High	CXA1315
88	BB2	00~3F	1D		BBE control Middle	(BBE)
89	BB3	00~3F	28		BBE control Low	Slv : 40H
8A	AIW	00~03	01		Auto Wide Ident speed	CXP5068 (Audio wide)Slv : 54H
8B	[illegible]	00~FF	00		Blk off Picture	CXP85340
8C	OSH	00~3F	0E		OSD Position H	(MICRO CO-
8D	ODL	00~FF	10		Power On Delay	NTROLLER)
8E	BLU	00~01	01		Blue Back on/off	
8F	[illegible]	00~0F	08		N/S Center VOl.	
90	[illegible]	00~07	07		User Step	
91	[illegible]	00~01	00		D/K Stereo Serch	
92	[illegible]	00~01	01		No. Sync, Mute	
93	DID	00~01	00		Disable Degaus	
94	DWZ	00~01	00		Disable Widezoom	
95	BCS	00~01	00		BASS Center Shift	
96	BVS	00~01	00		BASS Volume Shift	
97	WBS	00~03	00	NO FUNCTION	[illegible]	
98	OP0	00~FF	01		Option 0	
99	OP1	00~FF	BE		Option 1	

Note: [illegible] items are fixed data.

ITEM INFORMATION

♪ : ①-50Hz Widezoom ②-60Hz Widezoom ③-50Hz Zoom ④-60Hz Zoom
⑤-50Hz Subtitle ⑥-60Hz Subtitle ⑦-50Hz Normal ⑧-60Hz Normal
⑨-50Hz Full ⑩-60Hz~Full ⑪-TV0~90ch ⑫-TV91~99ch
⑬-VIDEO ⑭-TEXT NORMAL ⑮-TEXT MIX

5-3. PICTURE QUALITY ADJUSTMENTS

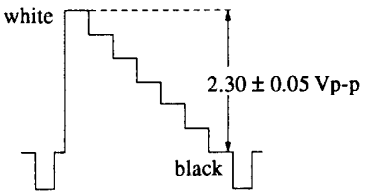
Item Number 33-36

33	SC1	Sub-Color (OTHER)	34	SC2	Sub-Color (NTSC)
35	SH1	Sub-HUE (TV)	36	SH2	Sub-Hue (VIDEO)

5-4. A BOARD ADJUSTMENT

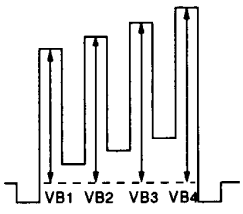
SUB CONTRAST ADJUSTMENT (SCN)

1. Receive a PAL color-bar.
2. Set service item 40 GON and 41 BON to data "00". Set the PICTURE 100%, BRIGHT 50% and COLOR MIN.
3. Connect an oscilloscope to the pin ⑥ (R OUT) of CN117, A board.
4. Set to Service Mode and select 32 (SCN) using [1] and [4] of the commander to adjust to 2.30 ± 0.05V.
5. Press [MUTING] → [0] of the commander to write the data.
6. Receive a NTSC color-bar and adjust 32 (SCN) as step 2~5.
7. Set servce item 40 GON and 41 BON to data "01".



SUB COLOR ADJUSTMENT (SCO)

1. select Video1
2. Input a PAL color-bar, video into video1.
   Set to the following condition:
   PIC 100%, BRT 50%, COL 50%
3. Connect an oscilloscope to the pin ④ (B OUT) of CN117, A board.
4. Set to Service Mode and select 33 (SC1) with [1] and [4] of the commander to adjust to VB2=VB3=VB4 with [3] and [6].
5. Press [MUTING] → [0] of the commander to write the data.
6. Adjust 33 (SC2) as step 1~4 when receiving NTSC color-bar.

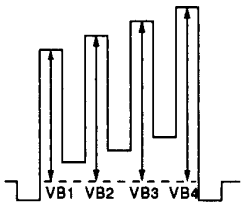


VB2 = VB3 = VB4

7. [Receive] the NTSC color-bar and adjust as step 6.

SUB HUE ADJUSTMENT (SHU)

1. Receive a NYSC color-ber
2. Connect an oscilloscope to the pin ④ (B OUT) of CN117, A board.
3. Select 35 (SH1) with [1] and [4] of the commandar by setting to Service Mode and adjust to VB1=VB2=VB3=VB4 with [3] and [6].



VB2 = VB3 = VB4

4. Press [MUTING] → [0] of the commander to write the data.
5. Set to WIDE Mode by [MENU] button to write the same value as in step 3.

PIP POSITION (POH, POV)

1. Receive a PAL color bar.
2. Set the PIP picture by pressing [PIP] button of the commander.
3. Set to Service Mode.
4. Select 5C (POH) with the [1] and [4] of the commander to set the data "14" with [3] and [6].
5. Select 5D (POV) to set the data "27"
6. Press [MUTING] → [0] of the commander to write the data.
7. Check by changing using menu .

5-5. A BOARD ADJUSTMENT AFTER IC003 (MEMORY) REPLACEMENT

1. Enter to Service Mode.

2. Press commander buttons [5] and [0] (Data Initialize), and [2] and [0] (Data Copy) to initialize the data.

3. Call each item number, and check if the respective screen shows the normal picture.
   In cases some items are not well - adjusted, give them fine adjustment.
   Write the data for each item number ([MUTING] +[0]).

4. Select item numbers "98" (OP0) and "99" (OP1) and respectively set the bit with command buttons [3] and [6].
   Then write the data for each item number ([MUTING] +[0]).

5. Receive a PAL or SECAM (50 Hz) signal. Set the unit FULL MODE, select the Item number "0D" (VSC), and set the Standard data to "1F".
   Perform the adjustments of items "00" through "OB".
   Writes the data for each item by pressing [MUTING] then [0].
   Set the value of item number "0C" (VAP) during wide mode, and adjust the item numbers "00" to "0B" so that the mode value is the same as in FULL MODE.
   Writes the data for each item by pressing [MUTING] then [0].

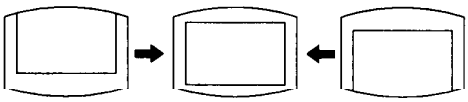
6. Receive a NTSC (60 Hz) signal.
   Perform the same adjustment in step 5.

7. Press commander buttons [8] and [0] (Test Normal) to return all user adjustments to the data that was set on shipment from the factory.
   This also will cancel Service Mode.

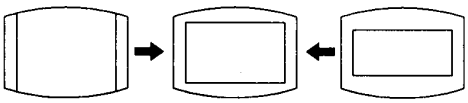
5-6. PICTURE DISTORTION ADJUSTMENT

Item Number 00 – 0B

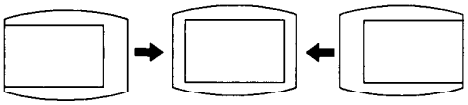
00 VSH(V POSITION)



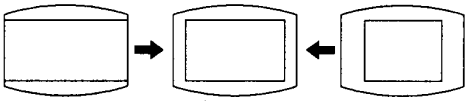
01 VSZ(V SIZE)



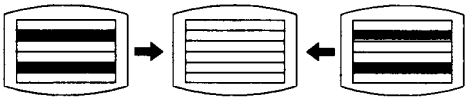
02 HSH(H POSITION)



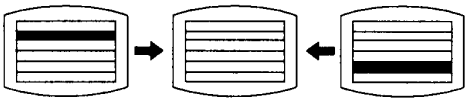
03 HSZ (H SIZE)



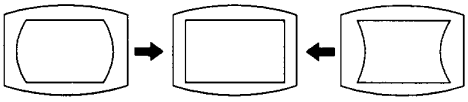
04 SCR(VERTICAL Scorrection)



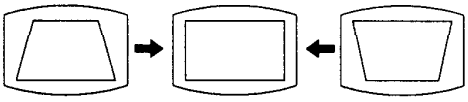
05 VLN(V LINEARITY)



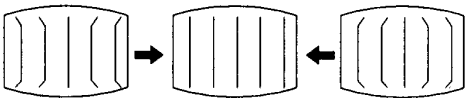
06 PAP (PIN AMP)



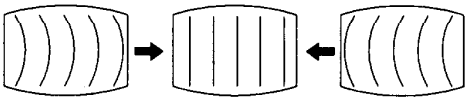
07 PPH(PIN PHASE)



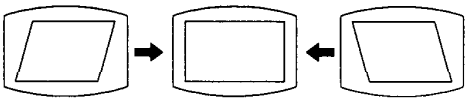
08 UCP(Upper Corner Pin)
09 LCP(Lower Corner Pin)



0A VBOW(AFC.BOW)

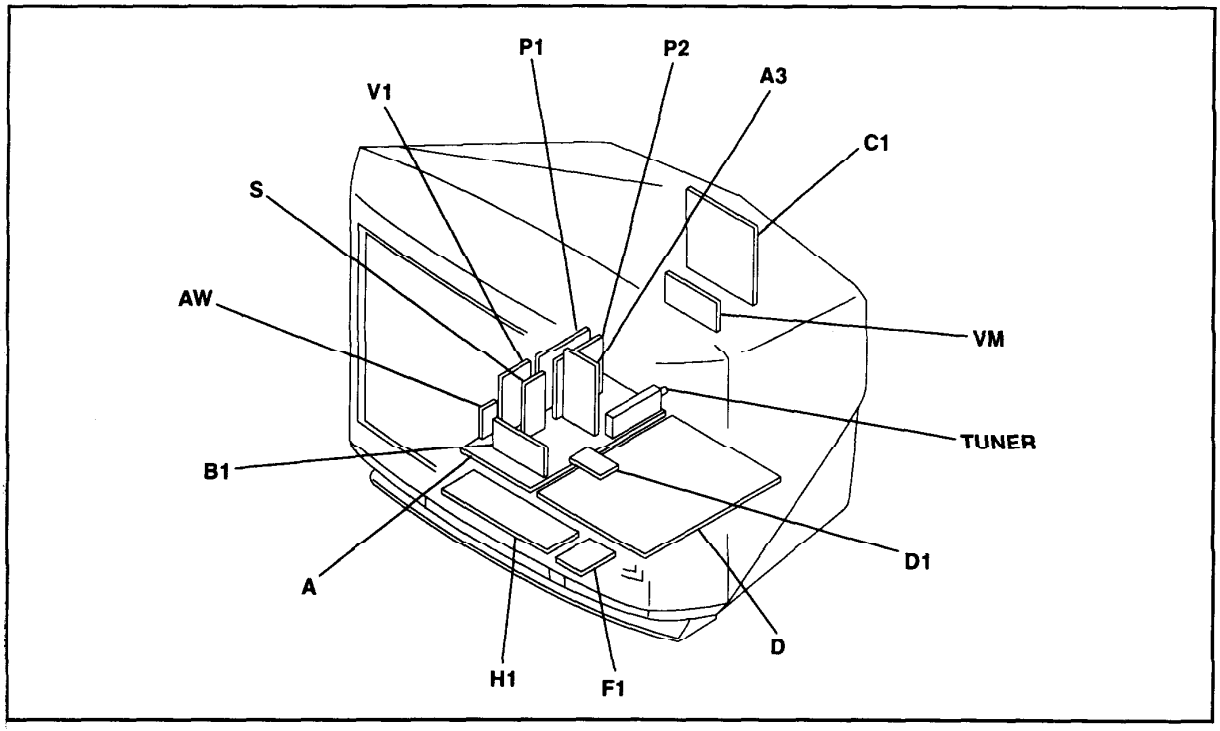


0B VAG(AFC.ANGLE)



6-3. CIRCUIT BOARDS LOCATION

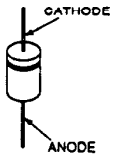
V1 Board: KV-V28MN11 (GE) ,KV-V28MH11 (ME) ONLY



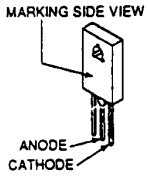
6-5. SEMICONDUCTORS

DIODE

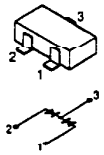
D1L20
EGP20G
EL1Z
GP08D
HSS83TD
RD5.1ES
RGP02-20EL



D5LC20U



DAL202K



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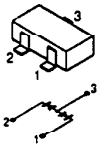
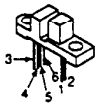
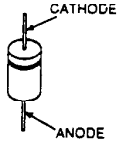


ERA33-06

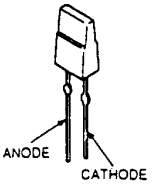


1 ANODE 3. GND 5 Vo1
2 CATHODE 4. Vc2 6 Vcc

ERD29-08J

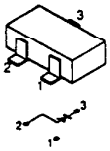


LN31GP



ON3171R

RD5.6ES-B1
RD5.6ES-B2
RD5.6M-B2
RD3.6M-B2



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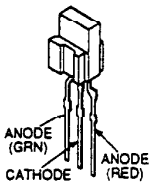
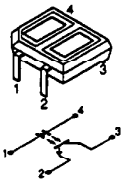


1N4148M



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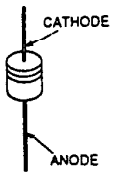
RD39ES-B2
RD4.7ESB2
RD6.8ES-B1
RD7.5ES-B1
RD8.2ES-B2
RD9.1ES-L



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ERC06-159
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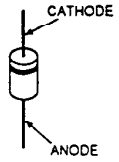
S3L20UF4



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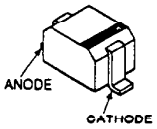

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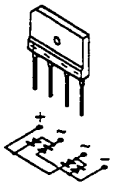
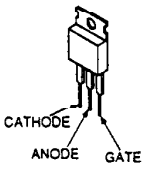
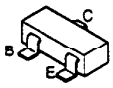


5P-6M
TF541M



TRANSISTOR

DTA144EK
DTA144EKA
DTC114EK
DTC124EK
DTC124EKA
RN1402
RN1403
RN1404
RN2402
UN2111
UN2113
UN2211
UN2212
UN2213
2SA1037AK
2SA1162-G
2SA1163-L5L6
2SA1576A
2SC1623-L5L6
2SC2712-YG
2SC4793
2SD601A-QRT



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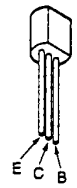

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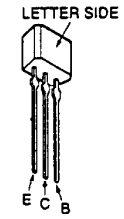
2SA933AS-QRT
2SC2785-HFE



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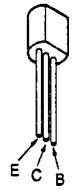

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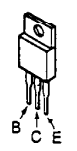

IC

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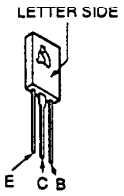

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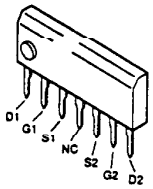
RN1202

2SC4927-01



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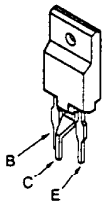
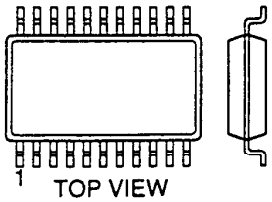


AN5342K
AT24C08A
CXA2050S
CXA1855S
CXP85340A
M5216P
MC140523
MSP3410B
P83C654
SAA5281ZP
ST24C08FB6
ST24D08CB1
TDA4665T-T
TDA8424
TDA9160A
UPC358C
UPC393C
UPC4558G2
UPC574J
XR1071CP

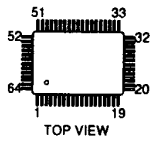
Dual In-line Package
Pin 6 ~ 98

BA7046F
BA7606F
CXA1315M
NJM2903D
SDA9187-2XGEG
SDA9189XGEG
TDA8395T
TDA9170

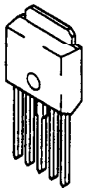


Small Outline L-leaded Package
Pin 8 ~ 98

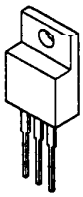
CXP5068H-246Q



L78LR05D-MA



NJM7805FA
NJM78M09FA
TA7805FA
TA7805S
TA7808S
TA7812S



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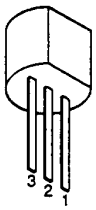
TA78L09S



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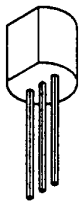
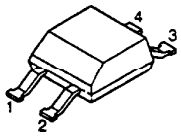
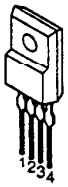


PC123

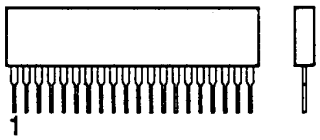


PQ05RF2



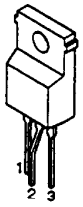
SBX1981-11
SBX1856

MARKING SIDE VIEW



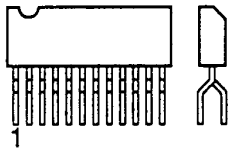
Single In-line Package
Pin 6 ~ 99

SE135N



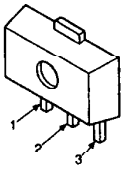
STR-S6709
TDA6101Q

MARKING SIDE VIEW

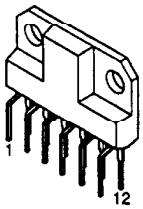


Zig-zag In-line Package
Pin 6 ~ 99

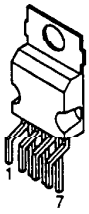
S-80743AL-A7



TA8200A



TDA8172



SECTION 7
EXPLODED VIEWS

The componants identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

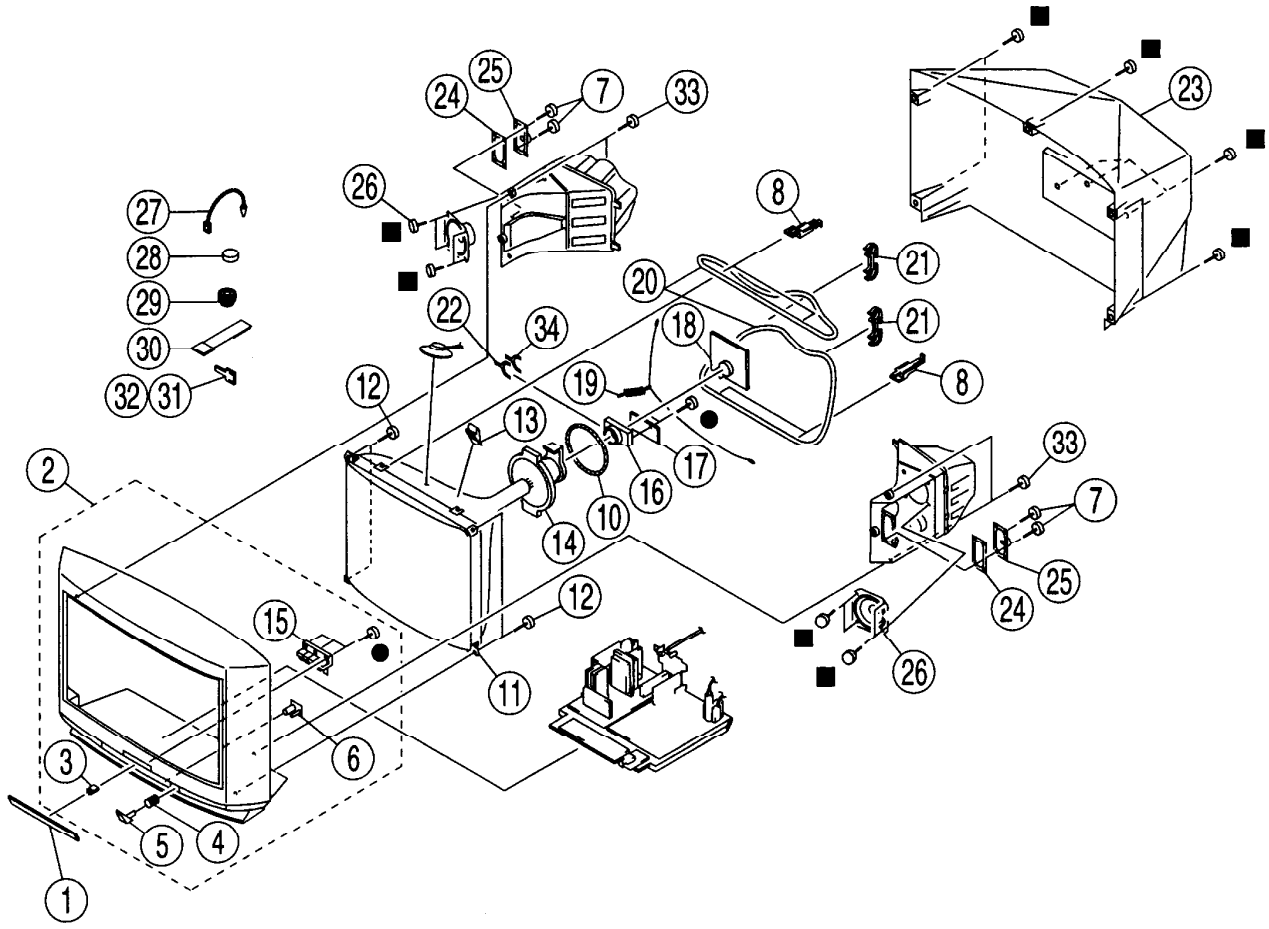
Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

7-1. PICTURE TUBE

● : 7-685-648-70 +BVTP 3X12
■ : 7-685-663-71 +BVTP 4X16



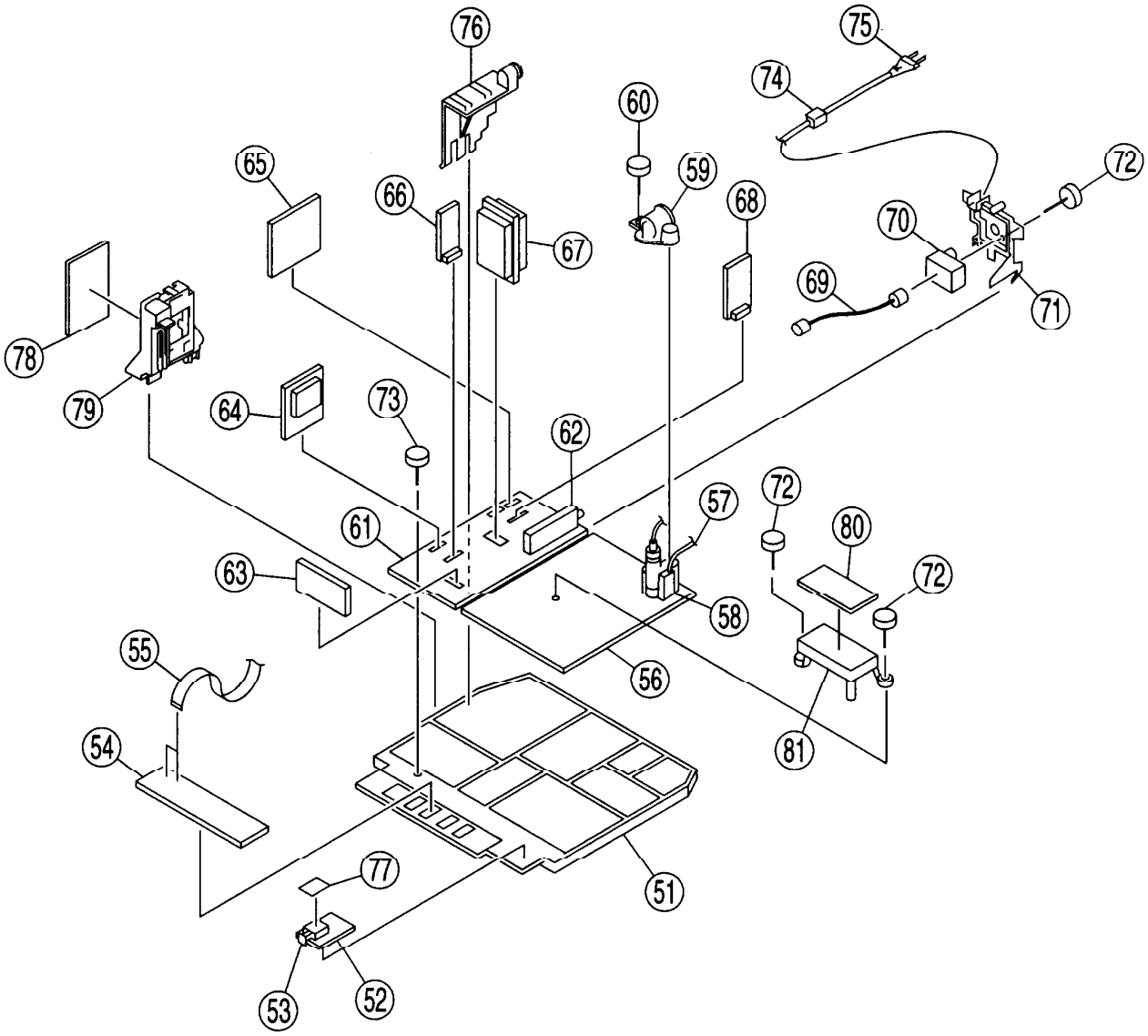
REF. NO.	PART NO.	DESCRIPTION	REMARK
1	4-054-439-11	DOOR, CONTROL	
2	X-4033-740-1	BEZNET ASSY	3-6,15
3	4-047-464-01	CATCHER, PUSH	
4	4-036-405-11	SPRING, COMPRESSION	
5	4-054-435-01	BUTTON, POWER	
6	* 4-054-437-01	GUIDE, LIGHT	
7	4-302-428-03	SCREW (WASHER HEAD) (+P 3X12)	
8	4-054-440-01	CLIP, DEGAUSSING COIL	
10	1-452-724-11	COIL, NA ROTATION (RT-165)	
11	⚠ 8-737-772-05	PICTURE TUBE (W66LGY011X) (MN11)	
	⚠ 8-737-773-05	PICTURE TUBE (W66LGY011X) (MH1/MH11)	
12	4-390-505-01	SCREW (7), TAPPING	
13	4-046-600-01	SPACER, DY	
14	⚠ 8-451-434-11	DEFLECTION YOKE (Y28QIAM)	
15	4-054-436-01	BUTTON, MULTI	
16	⚠ 1-452-762-31	NECK ASSEMBLY NA294	

REF. NO.	PART NO.	DESCRIPTION	REMARK
17	* A-1342-327-A	VM BOARD, COMPLETE (MH11/MN11)	
	* A-1342-328-A	VM BOARD, COMPLETE (MH1)	
18	* A-1331-564-A	C1 BOARD, COMPLETE	
19	4-369-318-61	SPRING, TENSION	
20	⚠ 1-411-936-11	COIL, DEMAGNETIC	
21	* 4-054-297-01	HOLDER, DGC	
23	4-054-438-01	COVER, REAR	
24	3-682-057-21	SPACER (SMALL)	
25	1-505-523-11	SPEAKER (9X5CM)	
26	1-505-543-11	SPEAKER (10CM)	
27	4-308-870-00	CLIP, LEAD WIRE	
28	1-452-032-00	MAGNET,DISK ; 10mmø	
29	1-452-094-00	MAGNET, ROTATABLE DISK ; 15mmø	
30	X-4387-214-1	PERMALOY ASSY, CORRECTION	
31	4-034-272-01	PLATE, CORRECTION, TLV	
32	4-034-272-11	PLATE, CORRECTION, TLV	
33	4-302-404-03	SCREW (WASHER HEAD) (+P 4X16)	
34	1-452-278-22	MAGNET, PURITY	

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite. Ne les remplacer que par une piece portant le numero specifie.

The componants identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

7-2. CHASSIS



REF. NO.	PART NO.	DESCRIPTION	REMARK
51	* 4-055-140-01	BRACKET, MAIN	
52	* A-1241-253-A	F1 BOARD, COMPLETE	
53	⚠ 1-571-433-21	SWITCH, PUSH (AC POWER)	
54	* A-1372-260-A	H1 BOARD, COMPLETE	
55	1-777-353-11	CABLE, FLAT	
56	* A-1346-512-A	D BOARD, COMPLETE (MH11/MN11)	
	* A-1346-587-A	D BOARD, COMPLETE (MH1)	
57	1-900-223-54	FOCUS LEAD ASSY	
58	⚠ 1-453-226-00	TRANSFORMER ASSY, FLYBACK	(NX-4122//M3I4)
59	* 4-055-139-01	HOLDER, FBT	
60	4-382-854-01	SCREW (M3X8), P, SW (+)	
61	* A-1297-875-A	A BOARD, COMPLETE (MN11)	
	* A-1298-028-A	A BOARD, COMPLETE (MH11)	
	* A-1298-030-A	A BOARD, COMPLETE (MH1)	
62	⚠ 8-598-372-00	TUNER (BTF-FG441)	
63	* A-1131-243-A	B1 BOARD, COMPLETE	
64	* A-1347-118-A	V1 BOARD, COMPLETE (MH11/MN11)	
65	* A-1195-108-A	P1 BOARD, COMPLETE (MH11/MN11)	
	* A-1195-113-A	P1 BOARD, COMPLETE (MH1)	

REF. NO.	PART NO.	DESCRIPTION	REMARK
66	* A-1390-616-A	S BOARD, COMPLETE	
67	* A-1297-860-A	A3 BOARD, COMPLETE	
68	* A-1190-248-A	P2 BOARD, COMPLETE	
69	* 1-555-110-00	CABLE, P-P	
70	1-251-447-11	DISTRIBUTOR, RF	
71	4-055-141-01	BRACKET, TERMINAL	
72	4-302-428-03	SCREW (WASHER HEAD) (+P 3X12)	
73	4-046-797-01	SCREW (3X12), (+)BVTAP	
74	4-022-115-00	HOLDER, AC CORD	
75	⚠ * 1-574-062-11	CORD, POWER (WITH CONNECTOR)	2.5A /250V (MH11/MN11)
	⚠ * 1-769-609-21	CORD, POWER (WITH CONNECTOR) (MH1)	
76	* 4-055-142-01	HOLDER, PC BOARD	
77	* 4-055-447-01	SHEET, INSULATING	
78	* A-1293-326-A	AW BOARD, COMPLETE	
79	* 4-056-335-01	BRACKET, AW PC BOARD	
80	* A-1343-261-A	D1 BOARD, COMPLETE	
81	* 4-056-334-01	BRACKET, D1 PC BOARD	

SONY

SERVICE MANUAL

BG-1L CHASSIS

MODEL	COMMANDER	DEST.	CHASSIS NO.	MODEL	COMMANDER	DEST.	CHASSIS NO.
KV-V28MH1	RM-872	Hong Kong	SCC-K56D-A				
KV-V28MH11	RM-872	ME	SCC-K57F-A				
KV-V28MN11	RM-872	GE	SCC-K52E-A				

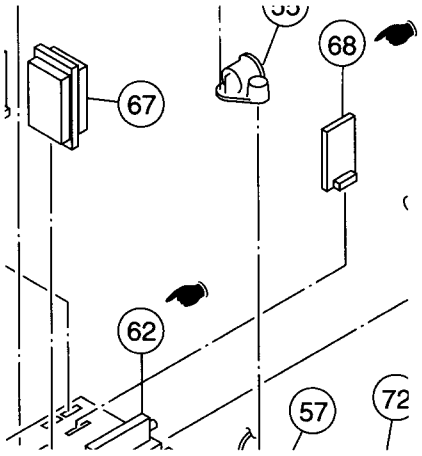
SUPPLEMENT-1

SUBJECT : PART CHANGE

File this supplement with the Service Manual.

SECTION 7 EXPLODED VIEWS

7–2. CHASSIS (see page 76)



REF. NO.	PART NO.	DESCRIPTION	REMARK
62	⚠ 8-598-372-10	TUNER, FSS BTF-FG441	
68	* A-1190-305-A	MOUNTED PC BOARD, P2 (KV-V28MH1)	

MICROFILM

SONY
SERVICE MANUAL

BG-1L CHASSIS

MODEL	COMMANDER	DEST.	CHASSIS NO.
KV-V28MH1	RM-872	Hong Kong	SCC-K56D-A
KV-V28MH11	RM-872	ME	SCC-K57F-A
KV-V28MN11	RM-872	GE	SCC-K52E-A

MODEL	COMMANDER	DEST.	CHASSIS NO.

SUPPLEMENT-2

SUBJECT : PART CHANGE

File this supplement with the Service Manual.

SECTION 8
ELECTRICAL PARTS LIST

NOTE:

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- All resistors are in ohms
- F : nonflammable

CAPACITORS
- MF : μF, PF : μμF

COILS
- MMH : mH, UH : μH

(See page 91)

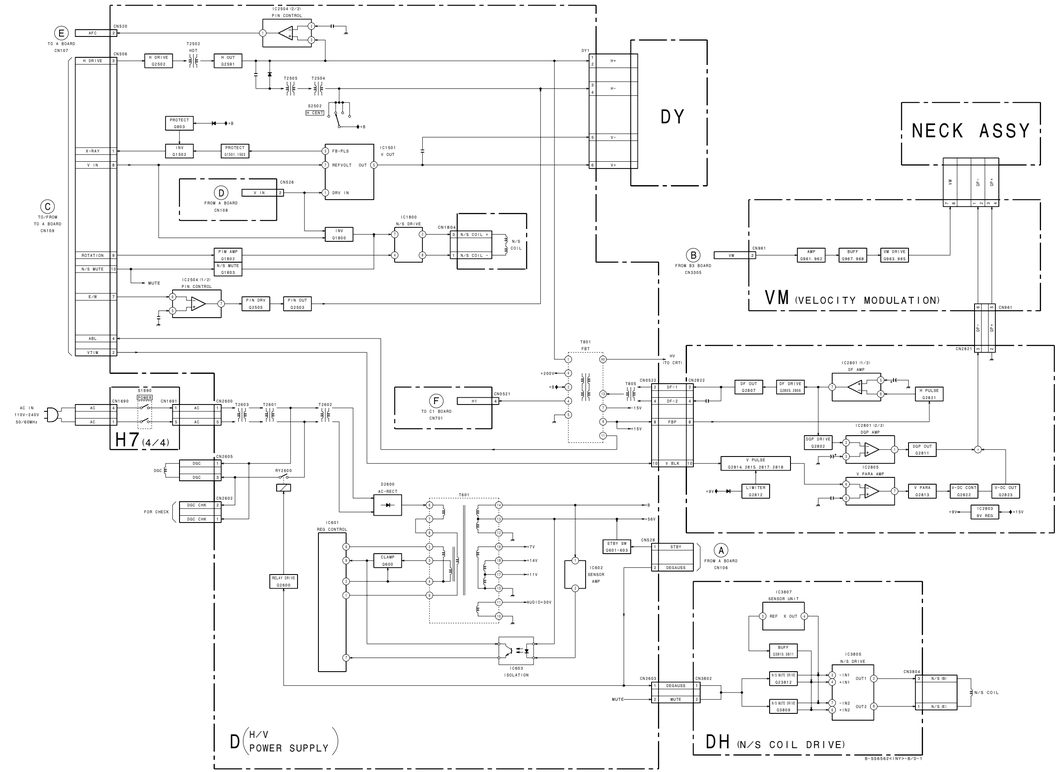
REF. NO.	PART NO.	DESCRIPTION			REMARK
C2617	1-125-905-11	ELECT (BLOCK)	560MF	20%	450V

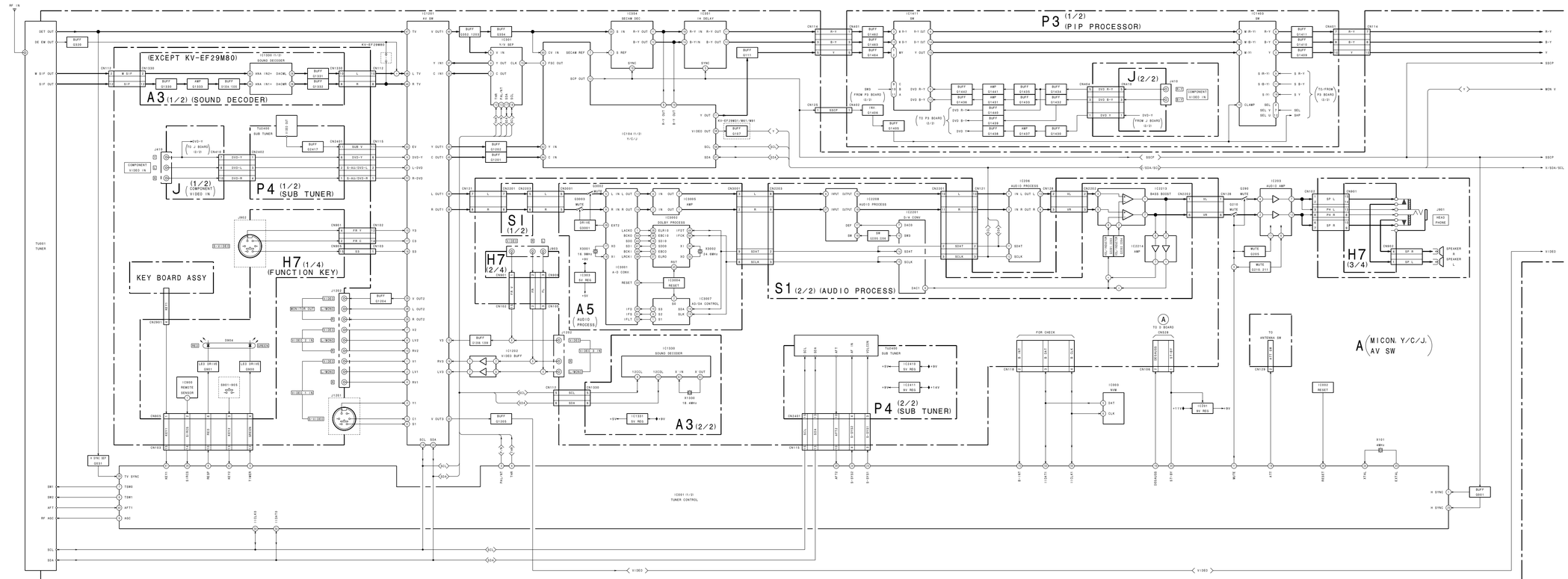
MICROFILM

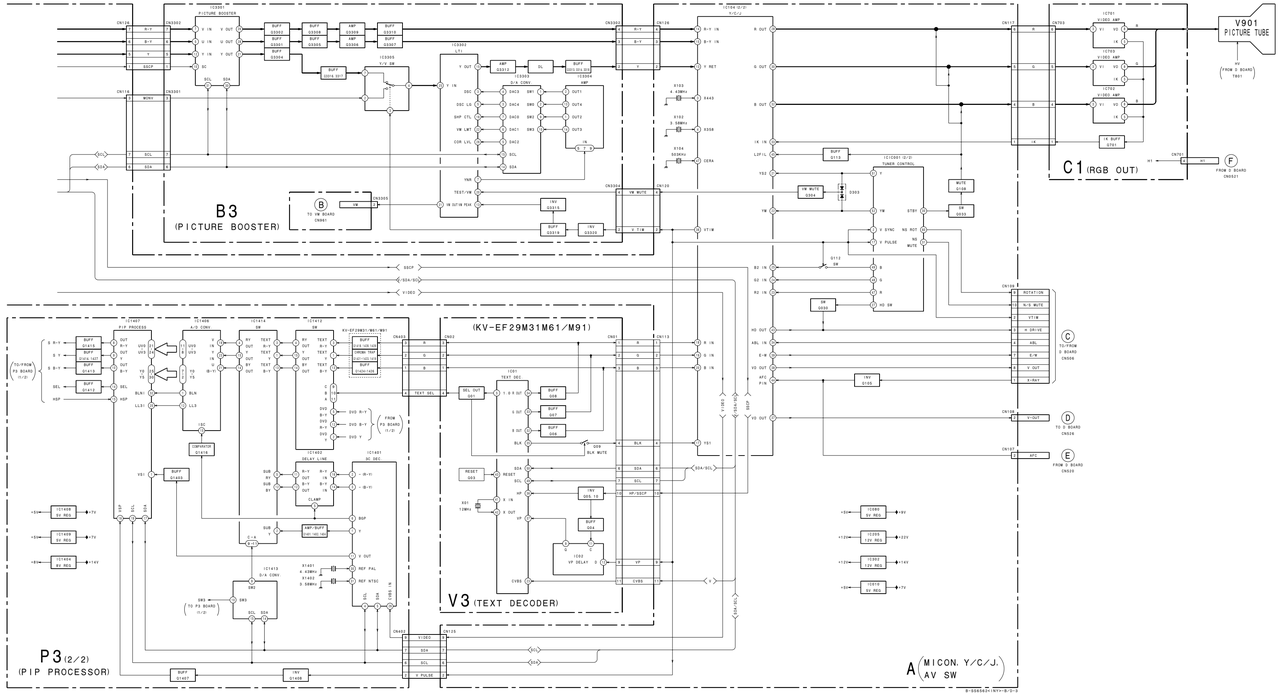
9-965-621-82

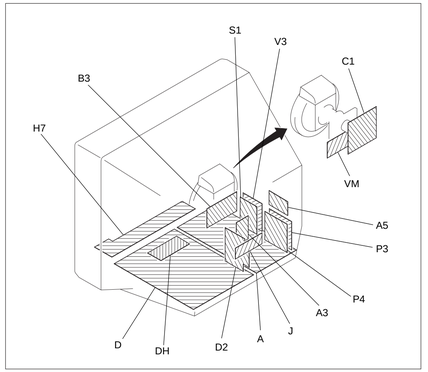
Sony Corporation
Display Company
TV Display Business Asia

English
98FG70180-1
Printed in Malaysia


DY
NECK ASSY
VM (VELOCITY MODULATION)
H7 (4/4)
D (H/V POWER SUPPLY)
DH (N/S COIL DRIVE)
TO A BOARD CN107
FROM X BOARD CN108
TO/FROM TO A BOARD CN108
FROM BD BOARD CN3005
TO CRT
TO Z1 BOARD CN701
FROM A BOARD CN106
AC IN 110V-240V 50-60Hz
FOR CHECK
N/S COIL
MUTE
H PULSE
V PULSE
SP OUT
SDP OUT
V PARA OUT
R-DC CONT
R-DC OUT
5V REG
SENSOR UNIT
REF X OUT
N/S DRIVE
DEGAUSS
STBY
PROTECT
FB-PLS
REFVOLT
DRV IN
V OUT
PIN AMP
PIN CONTROL
PIN SW
PIN OUT
N/S MUTE
SP AMP
SDP AMP
DF AMP
V PARA AMP
LIMITTER
AMP
BUFF
VM DRIVE
H DRIVE
V DRIVE
H OUT
V OUT
SENSOR AMP
ISOLATION
CLAMP
RELAY DRIVE
AC-RECT
REG CONTROL
FBT
B+
+200V
+15V
-15V
+12V
+11V
+7V
HUDI+30V
B-9368-PWB-INTV-B-D-1


RF IN
TU001 TUNER
A3 (1/2) (SOUND DECODER)
(EXCEPT KV-EF29M80)
IC1330 (1/2) SOUND DECODER
P4 (1/2) (SUB TUNER)
TU2400 SUB TUNER
J (1/2) COMPONENT VIDEO IN
COMPONENT VIDEO IN
H7 (1/4) (FUNCTION KEY)
KEY BOARD ASSY
IC1201 AV SW
IC1202 VIDEO BUFF
IC1301 Y/C SEP
IC354 SECAM DEC
IC351 1H DELAY
IC104 (1/2) Y/C/J
S1 (1/2)
H7 (2/4)
A5 AUDIO PROCESS
IC3001 A-D CONV.
IC3002 DOLBY PROCESS
IC3005 AMP
IC3004 RESET
IC3007 AD/DA CONTROL
IC3003 5V REG
A3 (2/2)
IC1330 SOUND DECODER
IC1331 5V REG
P4 (2/2) (SUB TUNER)
S1 (2/2) (AUDIO PROCESS)
IC2208 AUDIO PROCESS
IC2201 D/A CONV
IC206 AUDIO PROCESS
IC2213 BASS BOOST
IC2218 AMP
IC202 AUDIO AMP
P3 (1/2) (PIP PROCESSOR)
IC1411 SW
IC1403 SW
J (2/2)
H7 (3/4)
J901 HEAD PHONE
SPEAKER R
SPEAKER L
A (MICON, Y/C/J, AV SW)
FOR CHECK
TO S BOARD CN528
TO ANTENNA SW
IC003 NVM
IC201 9V REG
IC002 RESET
X101 8MHz
IC001 (1/2) TUNER CONTROL
BUFF Q001
H SYNC
VIDEO
SCL
SDA
R-Y
B-Y
Y
SSCP
MON V
V/SDA/SCL
B-SS6562<INY>-B/D-2


B3
(PICTURE BOOSTER)
C1 (RGB OUT)
V901
PICTURE TUBE
V3 (TEXT DECODER)
(KV-EF29M31M61/M91)
P3 (2/2)
(PIP PROCESSOR)
A (MICON. Y/C/J. AV SW)
PICTURE BOOSTER
TIMER CONTROL
PIP PROCESS
A/D CONV
D/A CONV
DELAY LINE
SC DEC
TEXT DEC
VIDEO AMP
5V REG
8V REG
12V REG
+22V REG
+15V REG
9V REG
+7V REG
TO TV BOARD CN081
FROM TV BOARD CN521
TO D BOARD CN526
FROM D BOARD CN532
TO/FROM P2 BOARD (1/2)
FROM TV BOARD (1/2)
TO P2 BOARD (1/2)



Note:

- All capacitors are in µF unless otherwise noted. (pF: µµF) Capacitors without voltage indication are all 50 V.
- Indication of resistance, which does not have one for rating electrical power, is as follows.

  Pitch: 5 mm
  Rating electrical power 1/4 W (CHIP : 1/10 W)

- All resistors are in ohms.
- : nonflammable resistor.
- : fusible resistor.
- : internal component.
- : panel designation, and adjustment for repair.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : earth-ground.
- : earth-chassis.
- All voltages are in V.
- Readings are taken with a 10 M digital multimeter.
- Readings are taken with a color-bar signal input.
- Voltage variations may be noted due to normal production tolerances.
- : Can not be measured.
- NO MARK: PAL
- < > : SECAM
- ( ) : NTSC 3.58 MHz
- Circled numbers are waveform references.
- : B + bus.
- : B – bus.
- : Signal path.

Reference information

RESISTOR	: RN	METAL FILM
	: RC	SOLID
	: FPRD	NONFLAMMABLE CARBON
	: FUSE	NONFLAMMABLE FUSIBLE
	: RW	NONFLAMMABLE WIREWOUND
	: RS	NONFLAMMABLE METAL OXIDE
	: RB	NONFLAMMABLE CEMENT
COIL	: LF-8L	MICRO INDUCTOR
CAPACITOR	: TA	TANTALUM
	: PS	STYROL
	: PP	POLYPROPYLENE
	: PT	MYLAR
	: MPS	METALIZED POLYESTER
	: MPP	METALIZED POLYPROPYLENE
	: ALB	BIPOLAR
	: ALT	HIGH TEMPERATURE
	: ALR	HIGH RIPPLE

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Terminal name of semiconductors in silk screen printed circuit (※)

	Device	Printed symbol	Terminal name	Circuit
①	Transistor		Collector / Base / Emitter	
②	Transistor		Collector / Base / Emitter	
③	Diode		Cathode / Anode	
④	Diode		Cathode / Anode (NC)	
⑤	Diode		Cathode / Anode (NC)	
⑥	Diode		Common Anode / Cathode	
⑦	Diode		Common Anode / Cathode	
⑧	Diode		Common Anode / Anode	
⑨	Diode		Common Anode / Anode	
⑩	Diode		Common Cathode / Cathode	
⑪	Diode		Common Cathode / Cathode	
⑫	Diode		Anode / Cathode, Anode / Anode, Cathode / Anode	
⑬	Transistor (FET)		Drain / Source, Gate	
⑭	Transistor (FET)		Drain / Source, Gate	
⑮	Transistor (FET)		S Source, D Drain, G Gate	
⑯	Transistor		E Emitter, C Collector, B Base	
⑰	Transistor		R1B041 / 6276FC1	
⑱	Transistor		6276FC2	
⑲	Transistor		C1 B2 E2 / E1 B1 C2	
⑳	Transistor		C1 B2 E2 / E1 B1 C2	
㉑	Transistor		E1 B1 C1 / C2 B2 E2	
㉒	Transistor		B2 C2 E2 / C1 B1 E1	
㉓	Transistor		E1 B1 C1 / C2 B2 E2	
–	Discrete semiconductor			

(Chip semiconductors that are not actually used are included.)

YWI-3.5

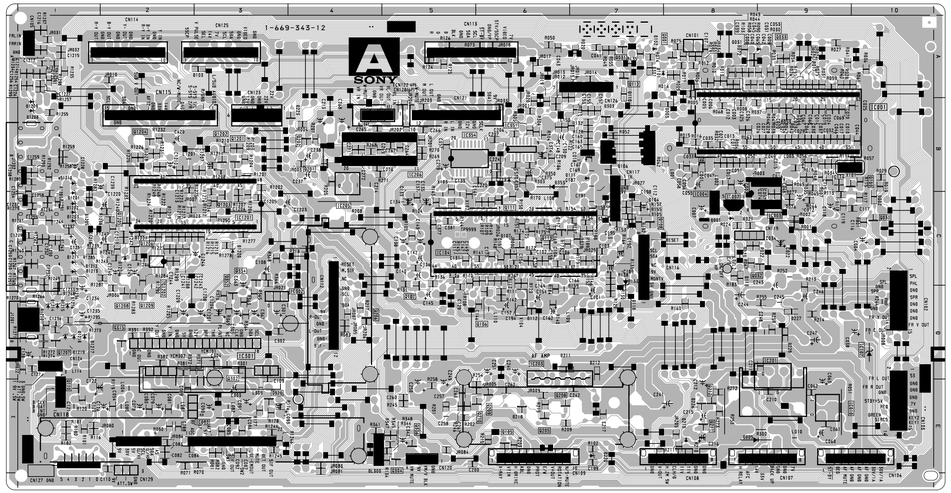
• A BOARD SEMICONDUCTOR LOCATION

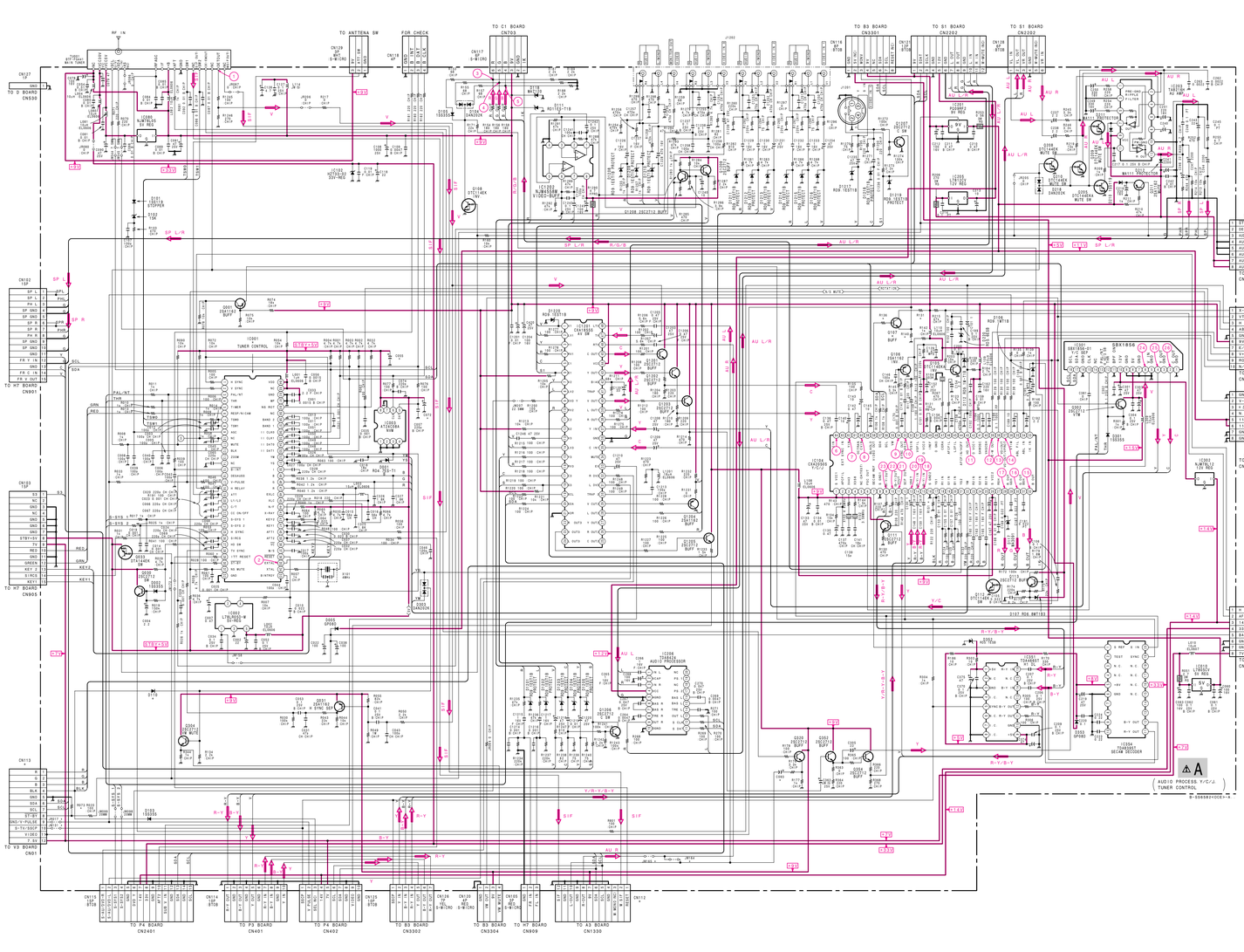
IC		DIODE	
IC001	B–9		※
IC002	C–8	D001	C–8
IC003	C–9	D002	C–10 ③
IC010	E–9	D005	E–9
IC080	E–2	D101	A–7
IC102	D–10	D102	A–7
IC104	C–6	D103	A–3 ②
IC201	D–9	D104	C–7 ④
IC203	E–6	D105	C–7 ③
IC205	C–4	D106	B–7 ④
IC206	B–5	D107	C–6 ④
IC301	D–2	D110	A–7 ③
IC302	D–3	D111	B–7
IC351	B–6	D112	D–8 ④
IC354	B–5	D117	C–6 ④
IC1201	C–3	D118	C–7
IC1202	C–2	D210	E–8
		D211	E–6 ③
		D212	E–7 ③
		D218	E–6 ④
		D220	E–7
		D301	A–7 ③
		D303	B–7 ④
		D352	B–6
TRANSISTOR		D353	B–6
	※	D1201	C–1
Q001	A–8 ①	D1202	C–1
Q030	C–10 ①	D1203	C–1
Q031	A–7 ①	D1204	C–2
Q033	A–9 ①	D1205	C–1
Q105	E–6 ①	D1208	B–1
Q106	D–6 ①	D1209	B–1
Q107	D–5 ①	D1210	B–1
Q108	C–7 ①	D1211	C–1
Q111	C–6 ①	D1212	C–1
Q112	A–7 ①	D1213	C–1
Q113	C–6 ①	D1214	D–1
Q205	E–6 ①	D1215	D–1
Q208	E–6 ①	D1216	D–1
Q209	E–6 ①	D1217	D–1
Q210	E–6 ①	D1218	D–1
Q211	E–8 ①	D1219	D–1
Q302	D–3 ①	D1220	C–3
Q304	E–5 ①		
Q320	E–3 ①		
Q352	D–3 ①		
Q354	C–3 ①		
Q1201	B–3 ①		
Q1202	B–3 ①		
Q1203	C–3 ①		
Q1204	B–2 ①		
Q1205	C–2 ①		
Q1206	C–2 ①		
Q1207	D–1 ①		
Q1208	D–2 ①		
Q1209	D–2 ①		
		CRYSTAL	
		X101	B–10
		X102	C–5
		X103	B–5
		X104	D–6

※: Refer to Terminal name of semiconductors in silk screen printed circuit (see page 55)

A MICON, YC/J, AV SW

— A BOARD —





① 2.4 Vp-p (H)	② 3.3 Vp-p (4MHz)	③ 3.1 Vp-p (H)	④ 2.8 Vp-p (H)	⑤ 2.7 Vp-p (H)	⑥ 0.9 Vp-p (H)		
⑥ SECAM 0.5 Vp-p (H)	⑥ 0.8 Vp-p (H)	⑦ 1.1 Vp-p (H)	⑧ 1.5 Vp-p (H)	⑧ 1.2 Vp-p (H)	⑧ 1.2 Vp-p (H)		
⑨ 2.2 Vp-p (H)	⑩ 1.8 Vp-p (H)	⑪ 2.8 Vp-p (H)	⑫ 0.6 Vp-p (V)	⑬ 1.2 Vp-p (V)	⑭ 1.2 Vp-p (V)		
⑮ 2.7 Vp-p (H)	⑯ 2.8 Vp-p (H)	⑰ 3.1 Vp-p (H)	⑱ 1.9 Vp-p (H)	⑲ 1.5 Vp-p (H)	⑳ 1.1 Vp-p (H)		
㉑ 1.2 Vp-p (H)	㉑ 1.7 Vp-p (H)	㉒ PAL 1.1 Vp-p (H) SECAM 1.5 Vp-p (H)	㉒ 1.5 Vp-p (H)	㉓ PAL 0.8 Vp-p (H) SECAM 1.1 Vp-p (H)	㉓ 1.3 Vp-p (H)		
㉔ PAL 2.3 Vp-p (H)	㉔ 2.2 Vp-p (H)	㉔ NTSC 3.58 2.1 Vp-p (H)	㉕ PAL SECAM 2.1 Vp-p (H)	㉖ 1.7 Vp-p (H)	㉖ 1.0 Vp-p (H)		
㉖ 0.6 Vp-p (H)							

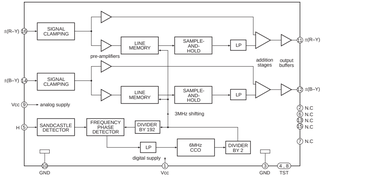
Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]
IC001	1	0.6		54	4.5		38	3.2		15	5.9		31	4.0		B	0
	2	0.8		55	4.9		39	4.3		16	5.8		32	4.0	Q208	C	11.6
	3	0<D>(4.9)		56	4.3		40	4.2					33	4.0		B	0
	4	0		57	1.3		41	4.9	IC301	2	6.6		35	4.0			
	5	0		58	0		43	2.5		4	5.5		37	4.0	Q209	C	0
	6	0		59	0.4		44	3.6		6	4.7		38	4.1		B	0
	7	0		60	1.7		45	5.3		12	0.4		39	4.1	Q210	C	0
	8	0					46	4.4		13	0<4.8>(0)		40	3.9		B	0
	9	4.9	IC002	1	8.8		47	2.6		15	5.6		42	4.1			
	10	0		2	5.8		49	1.9		17	4.8		43	4.0	Q211	E	10.9
	11	0		4	4.9		51	2.4		18	4.7		45	4.0		C	0
	12	4.8					52	4.4					46	4.0		B	10.7
	14	1.0	IC003	5	4.8		53	4.4	IC302	1	15.9		47	4.0	Q302	E	0.3
	15	4.9		6	4.9		54	5.0		O	12.1		48	4.1		B	0.8
	16	0	IC010	I	7.0		55	6.4				IC1202	1	4.8	Q304	E	0
	17	0.8		O	4.9		56	4.7	IC351	5	0.7		2	2.4		B	0
	18	4.8	IC080	I	9.0		57	4.7		11	2.9		3	2.4	Q320	E	2.2
	19	0		O	5.0		58	3.7		12	2.9		5	2.4		B	2.8
	20	0					59	4.2		14	1.4		6	2.4	Q352	E	2.6
	21	4.9	IC104	2	5.0		60	4.3		16	1.4		7	4.8		B	3.3
	22	4.9		3	2.7		61	5.5	IC354	1	1.5				Q354	E	2.0
	23	0		4	8.4		62	4.3		9	3.2	Q001	E	0.9		B	2.6
	24	0		6	5.6		63	4.7		10	4.3		C	0.6	Q330	E	0
	25	0.6		7	1.5<5.2>(1.5)		64	4.4		11	5.7		B	0.3		B	0
	26	4.8		9	5.7<3.2>(5.7)	IC201	I	10.3		12	5.7				Q1201	E	3.3
	27	0		10	5.7<3.2>(5.7)		O	9.1		19	0.8	Q030	E	0		B	4.0
	28	0.3		11	4.0		SW	4.5		20	1.1		B	0	Q1202	E	3.3
	29	4.8		12	0.9	IC203	1	1.4	IC1201	1	4.1	Q031	E	8.8		B	4.0
	30	4.6		13	5.3		2	0		2	4.1		B	9.0	Q1203	E	3.3
	31	0		14	5.8		4	0		3	4.0	Q033	C	0		B	3.9
	33	1.2		15	5.8		5	1.4		4	4.0		B	4.5	Q1204	E	4.6
	34	*		17	0		6	11.6		5	4.0	Q105	C	3.5		B	4.0
	35	2.1		18	5.8		7	16.4		6	8.1		B	0.4	Q1205	E	3.4
	36	4.9		19	5.8		8	5.1		7	4.1	Q106	E	5.5		B	4.0
	37	0		20	5.8		11	4.2		8	4.0		B	0.8	Q1206	C	8.1
	38	4.9		21	0		12	15.8		9	4.0	Q108	C	3.0		B	0
	39	3.7		22	0	IC205	I	16.0		10	4.0		B	0	Q1207	C	8.1
	40	1.8		23	5.8		O	11.8		12	8.1	Q111	E	3.2		B	0
	41	4.9		24	5.8	IC206	1	5.8		13	4.0		B	3.8	Q1208	E	1.7
	42	4.9		25	5.8		2	11.7		14	4.0	Q112	C	0		B	5.3
	43	4.9		27	1.8		3	5.8		15	4.0		B	0.8	Q1209	E	2.4
	44	4.9		28	2.6		6	5.9		16	4.0	Q113	E	2.5		B	4.7
	45	2.7		29	1.8		7	5.9		17	4.0		B	8.9			
	46	2.7		30	2.3		8	5.9		18	8.1		B	2.8			
	47	0		31	2.1		9	5.8		19	4.5	Q205	C	4.2			
	48	0		32	2.1		11	4.0		20	4.5						
	49	0		33	5.6		12	4.6		23	3.9						
	50	0		34	1.4		13	5.9		26	4.1						
	51	0		35	8.2		14	5.9		29	3.9						
	52	0		36	0.9					30	4.0						
	53	4.9		37	3.1												

• A BOARD DESCRIPTION

• A BOARD ＊ MARK PARTS LIST

Ref No.	KV-EF29M31	KV-EF29M61	KV-EF29M80(JE)	KV-EF29M80(ME)	KV-EF29M90	KV-EF29M91
C055	100 16V	100 16V	470 16V	470 16V	100 16V	100 16V
C072	330 16V	330 16V	470 16V	470 16V	330 16V	330 16V
C093	NOT USED	NOT USED	47 25V	47 25V	NOT USED	NOT USED
CN113	12P :BTOB	12P :BTOB	NOT USED	NOT USED	NOT USED	12P :BTOB
D110	1SS355	1SS355	NOT USED	NOT USED	NOT USED	1SS355
IC001	CXP85452-090S	CXP85452-090S	CXP85452-090S	CXP85452-091S	CXP85452-090S	CXP85452-091S
JR017	0 :CHIP	0 :CHIP	NOT USED	NOT USED	NOT USED	0 :CHIP
JW131	10MM	10MM	NOT USED	NOT USED	NOT USED	10MM
JW158	22 2W :RS	22 2W :RS	NOT USED	JW(17.5)	22 2W :RS	22 2W :RS
JW164	NOT USED	NOT USED	10MM	10MM	NOT USED	NOT USED
JW165	10MM	10MM	NOT USED	NOT USED	10MM	10MM
JW172	10MM	10MM	NOT USED	NOT USED	10MM	10MM
Q107	2SC2712	2SC2712	NOT USED	NOT USED	NOT USED	2SC2712
R060	100 :CHIP	100 :CHIP	NOT USED	NOT USED	100 :CHIP	100 :CHIP
R073	47k :CHIP	47k :CHIP	10k :CHIP	10k :CHIP	10k :CHIP	47k :CHIP
R131	0 :CHIP	0 :CHIP	NOT USED	NOT USED	NOT USED	0 :CHIP
R136	0 :CHIP	0 :CHIP	NOT USED	NOT USED	NOT USED	0 :CHIP
R140	470 :CHIP	470 :CHIP	NOT USED	NOT USED	NOT USED	470 :CHIP
R151	NOT USED	NOT USED	560 :CHIP	560 :CHIP	NOT USED	NOT USED

• A BOARD IC351 TDA4665T



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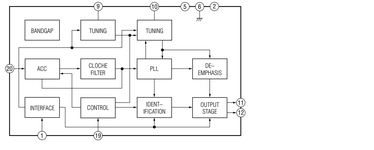
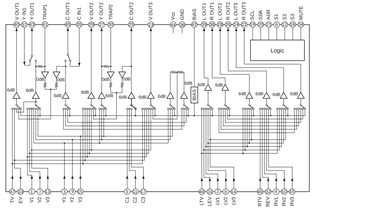
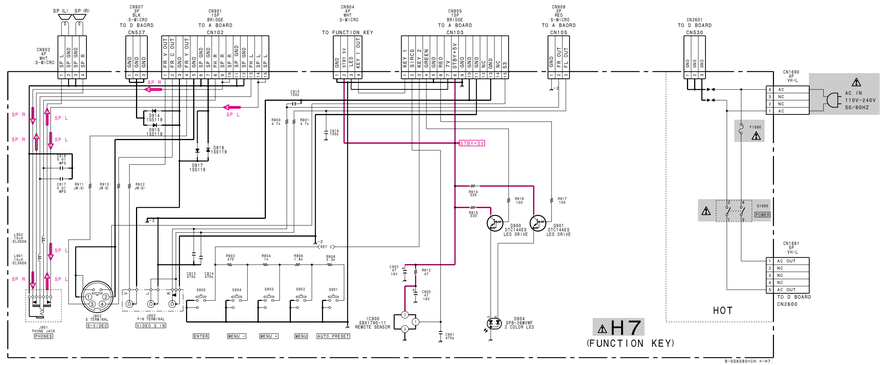


• A BOARD IC1201 CXA1855S



Schematic diagram ← A board

Schematic diagrams H7 J P3 P4 boards →



• H7 BOARD VOLTAGE LIST

Ref.	Pin No.	Voltage [V]
IC900	1	5.0
Q900	E	0
	C	5.0
	B	0
Q901	E	0
	C	5.0
	B	0

• P4 BOARD VOLTAGE LIST

Ref.	Pin No.	Voltage [V]
IC2410	I	8.9
	O	5.0
IC2411	I	14.9
	O	8.9
Q2417	E	2.7
	B	3.4

• P4 BOARD DESCRIPTION

REF. NO.	
IC2410	5V REG
IC2411	9V REG
Q2417	BUFF

• P3 BOARD VOLTAGE LIST

Ref.	Pin No.	Voltage [V]
IC1401	1	2.3
	2	2.2
	3	2.1
	4	4.3
	5	4.6
	6	0.4
	8	5.0
	11	6.6
	12	3.9
	14	1.7
	21	3.6
	26	3.3
	28	3.4
	29	4.4
	30	2.0
	31	1.9
	32	3.9
IC1402	5	0.4
	11	3.0
	12	2.9
	14	1.4
	16	1.4
IC1403	1	3.2
	2	0.3
	3	1.8
	5	1.5
	6	1.5
	7	0.3
	8	2.9
IC1404	I	12.6
	O	7.9
IC1406	1	4.2
	2	0
	3	0
	4	0
	5	0
	6	0.4
	7	1.0
	8	0.5
	9	0.5
	10	0.4
	11	0.5
	12	2.6
	15	0.3
	17	2.0
	19	2.7
	20	1.0
	21	2.7
	22	2.0
	23	2.2
	25	5.0
IC1407	1	0.4
	2	2.5
	3	2.0
	5	3.1
	8	0.8
	9	0
	10	1.0
	14	0
	15	0.3
	17	4.5
	18	4.5
	20	2.6
	21	0.5
	22	0.4
	23	0.5
	24	0.5
	25	1.0
	26	0.4
	27	0
	28	0
	29	0
	30	0
	32	4.2
IC1408	I	7.2
IC1409	I	7.2
	O	5.0
IC1411	1	3.9
	2	3.9
	3	3.6
	4	3.6
	5	2.1
	9	5.0
	10	5.0
	11	5.0
	12	1.7
	13	3.7
	14	3.6
	15	3.9
IC1412	1	1.2
	2	7.9
	3	3.5
	4	3.8
	5	3.8
	9	0
	10	0
	11	0
	12	3.7
	13	3.5
	14	3.7
	15	7.9
IC1413	9	0
	10	5.0
	14	4.5
	15	4.5
IC1414	1	7.9
	2	4.1
	3	3.8
	4	3.0
	5	3.0
	9	0
	10	0
	11	0
	12	2.9
	13	3.7
	14	2.9
	15	4.5
Q1401	E	2.2
	C	7.3
	B	2.8
Q1402	C	4.7
	B	7.3
Q1403	C	0.4
	B	3.0
Q1404	E	4.0
	B	4.7
Q1405	C	0.4
	B	3.3
Q1406	C	3.3
	B	0.2
Q1407	C	0.3
	B	4.6
Q1408	C	4.6
	B	4.4
Q1409	E	2.5
	B	1.8
Q1410	E	2.2
	B	1.5
Q1411	E	2.2
	B	1.5
Q1412	E	0.3
	B	0
Q1413	E	1.6
	B	1.0
Q1414	E	1.4
	B	0.7
Q1415	E	1.4
	B	0.8
Q1416	E	0.4
	B	3.0
Q1427	E	0.7
	C	0
	B	0
Q1430	E	3.3
	C	6.4
	B	3.9
Q1431	E	2.3
	C	5.6
	B	3.0
Q1432	E	1.6
	C	3.6
	B	2.2
Q1433	E	3.0
	C	7.9
	B	3.6
Q1434	E	1.9
	C	4.0
	B	2.6
Q1435	E	3.4
	B	4.0
Q1436	E	1.7
	B	2.3
Q1437	E	7.2
	C	7.2
	B	6.4
Q1438	E	7.9
	B	7.2
Q1439	E	3.7
	B	4.4
Q1440	E	3.8
	B	4.5
Q1441	E	2.7
	C	5.2
	B	3.4
Q1442	E	2.1
	B	2.7
Q1462	E	3.6
	B	3.0
Q1463	E	3.6
	B	3.0
Q1464	E	3.9
	B	3.2

• P3 BOARD WAVEFORMS

• P3 BOARD DESCRIPTION

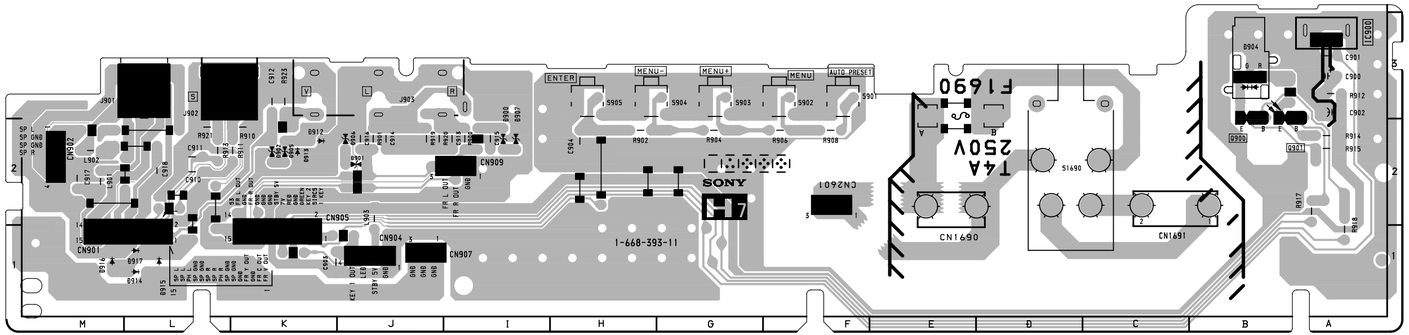
REF. NO.		REF. NO.		REF. NO.	
IC1401	3C DECODER	Q1408	INVERTER	Q1429	AMP
IC1402	DELAY LINE	Q1409	BUFF	Q1430	AMP
IC1403	SWITCH	Q1410	BUFF	Q1431	AMP
IC1404	8V REG	Q1411	BUFF	Q1432	BUFF
IC1406	A/D CONVERTER	Q1412	BUFF	Q1433	BUFF
IC1407	PIP PROCESSOR	Q1413	BUFF	Q1434	BUFF
IC1408	5V REG	Q1414	BUFF	Q1435	BUFF
IC1409	5V REG	Q1415	BUFF	Q1436	BUFF
IC1411	D/A CONVERTER	Q1416	COMPARATOR	Q1437	BUFF
IC1412	SWITCH	Q1418	R BUFF	Q1438	BUFF
IC1413	D/A CONVERTER	Q1419	BUFF	Q1439	BUFF
IC1414	SWITCH	Q1421	Y BUFF	Q1440	BUFF
Q1401	AMP	Q1422	G BUFF	Q1441	AMP
Q1402	AMP	Q1423	AMP	Q1442	BUFF
Q1403	BUFF	Q1424	B BUFF	Q1462	BUFF
Q1404	BUFF	Q1425	-(B-Y) BUFF	Q1463	BUFF
Q1405	BUFF	Q1426	AMP	Q1464	BUFF
Q1406	INVERTER	Q1427	AMP		
Q1407	BUFF	Q1428	-(R-Y) BUFF		

• P3 BOARD ∗ MARK PARTS LIST

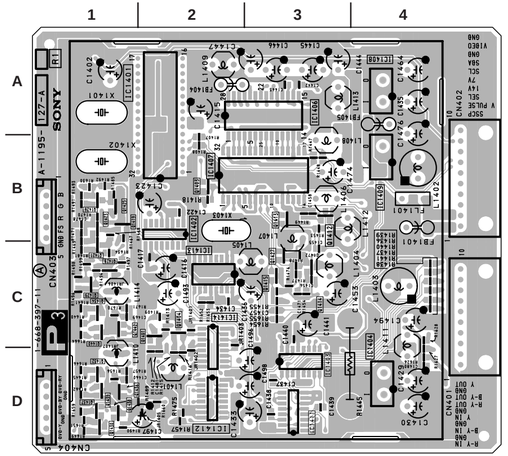
Ref No.	KV-EF29M31	KV-EF29M61	KV-EF29M80	KV-EF29M90	KV-EF29M91
C1478	1 16v F:CHIP	1 16v F:CHIP	NOT USED	NOT USED	1 16v F:CHIP
CN403	5P WHT :S-MICRO	5P WHT :S-MICRO	NOT USED	NOT USED	5P WHT :S-MICRO
Q1418	2SA1162	2SA1162	NOT USED	NOT USED	2SA1162
Q1419	2SC2712	2SC2712	NOT USED	NOT USED	2SC2712
Q1421	2SC2712	2SC2712	NOT USED	NOT USED	2SC2712
Q1422	2SA1162	2SA1162	NOT USED	NOT USED	2SA1162
Q1423	2SC2712	2SC2712	NOT USED	NOT USED	2SC2712
Q1424	2SA1162	2SA1162	NOT USED	NOT USED	2SA1162
Q1425	2SC2712	2SC2712	NOT USED	NOT USED	2SC2712
Q1426	2SC2712	2SC2712	NOT USED	NOT USED	2SC2712
Q1428	2SC2712	2SC2712	NOT USED	NOT USED	2SC2712
Q1429	2SC2712	2SC2712	NOT USED	NOT USED	2SC2712
R1422	390 :CHIP	390 :CHIP	NOT USED	NOT USED	390 :CHIP
R1442	180 :CHIP	180 :CHIP	NOT USED	NOT USED	180 :CHIP
R1443	2.7k :CHIP	2.7k :CHIP	NOT USED	NOT USED	2.7k :CHIP
R1465	820 :CHIP	820 :CHIP	NOT USED	NOT USED	820 :CHIP
R1466	2.7k :CHIP	2.7k :CHIP	NOT USED	NOT USED	2.7k :CHIP
R1467	2.7k :CHIP	2.7k :CHIP	NOT USED	NOT USED	2.7k :CHIP
R1468	1k :CHIP	1k :CHIP	NOT USED	NOT USED	1k :CHIP
R1469	1k :CHIP	1k :CHIP	NOT USED	NOT USED	1k :CHIP
R1470	220k :CHIP	220k :CHIP	NOT USED	NOT USED	220k :CHIP
R1471	150k :CHIP	150k :CHIP	NOT USED	NOT USED	150k :CHIP
R1472	220 :CHIP	220 :CHIP	NOT USED	NOT USED	220 :CHIP
R1473	220 :CHIP	220 :CHIP	NOT USED	NOT USED	220 :CHIP
R1474	220 :CHIP	220 :CHIP	NOT USED	NOT USED	220 :CHIP
R1485	2.7k :CHIP	2.7k :CHIP	NOT USED	NOT USED	2.7k :CHIP
R1491	1k :CHIP	1k :CHIP	NOT USED	NOT USED	1k :CHIP
R1492	1k :CHIP	1k :CHIP	NOT USED	NOT USED	1k :CHIP
R1493	1k :CHIP	1k :CHIP	NOT USED	NOT USED	1k :CHIP
R1494	2.7k :CHIP	2.7k :CHIP	NOT USED	NOT USED	2.7k :CHIP
R1496	1k :CHIP	1k :CHIP	NOT USED	NOT USED	1k :CHIP
R1497	1k :CHIP	1k :CHIP	NOT USED	NOT USED	1k :CHIP
R1498	1k :CHIP	1k :CHIP	NOT USED	NOT USED	1k :CHIP
R1499	1k :CHIP	1k :CHIP	NOT USED	NOT USED	1k :CHIP
R1629	2.7k :CHIP	2.7k :CHIP	NOT USED	NOT USED	2.7k :CHIP
R1630	1k :CHIP	1k :CHIP	NOT USED	NOT USED	1k :CHIP

[ ] P3 [PIP PROCESSOR]

— H7 BOARD —



— P3 BOARD (Component Side) —



• : Pattern from the side which enables seeing.
• : Pattern of the rear side.

• P3 BOARD SEMICONDUCTOR LOCATION

IC

	(Conductor Side)	(Component Side)
IC1401	B–1	
IC1402		B–3
IC1403		C–1
IC1404	D–4	
IC1406		C–4
IC1407		B–3
IC1408	D–1	
IC1409	D–2	
IC1411		C–1
IC1412		B–1
IC1413		B–3
IC1414		B–2

TRANSISTOR

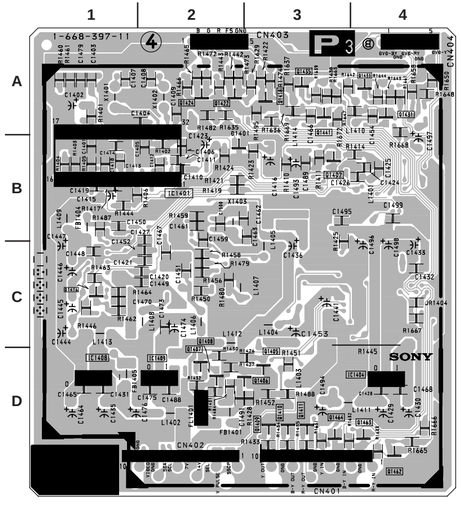
	(Conductor Side)	(Component Side) *	
Q1401		B–2	②
Q1402	B–3		①
Q1403		B–3	②
Q1404		B–2	②
Q1405	D–3		①
Q1406	D–3		①
Q1407	D–2		①
Q1408	D–2		①
Q1409	D–3		①
Q1410	D–3		①
Q1411	D–3		①
Q1412		C–3	②
Q1413		C–3	②
Q1414		C–2	②
Q1415		C–2	②
Q1416	C–1		①
Q1418	A–3		①
Q1419		A–3	②
Q1421		A–2	②
Q1422	A–2		①
Q1423		A–3	②
Q1424	A–2		①
Q1425		A–3	②
Q1426		A–3	②
Q1427		C–2	②
Q1428		A–2	②
Q1429		A–2	②
Q1430		A–1	②
Q1431	A–4		①
Q1432		A–1	②
Q1433	A–4		①
Q1434		A–2	②
Q1433	A–4		①
Q1434		A–2	②
Q1435	A–3		①
Q1436		A–1	②
Q1437		A–1	②
Q1438		A–1	②
Q1439		A–1	②
Q1440		A–2	②
Q1441	A–3		①
Q1442		B–1	②
Q1462	D–4		①
Q1463	D–4		①
Q1464	D–3		①

CRYSTAL

	(Conductor Side)	(Component Side)
X1401	A–1	
X1402	A–2	
X1403	B–2	

*: Refer to Terminal name of semiconductors in silk screen printed circuit (see page 55)

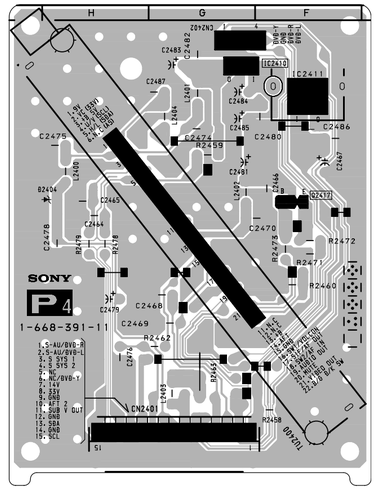
— P3 BOARD (Conductor Side) —



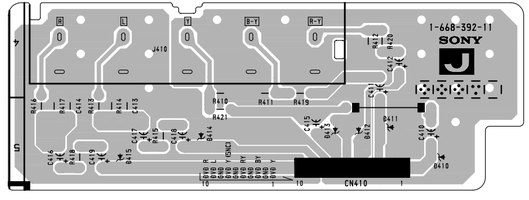
• : Pattern from the side which enables seeing.
• : Pattern of the rear side.

P4 [SUB TUNER] J [COMPONENT VIDEO IN]

— P4 BOARD —



— J BOARD —



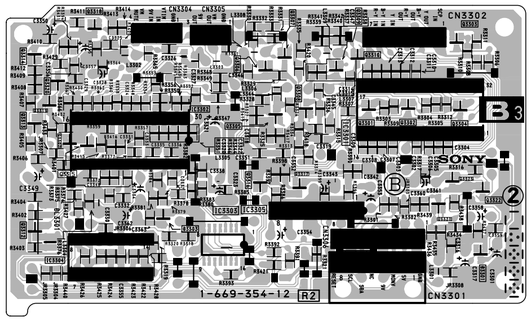
[ ] V3 [TEXT DECODER]

B3 BOARD
Terminal name of semiconductors in silk screen printed circuit (∗)

Ref.	∗
Q3301, Q3302, Q3304-Q3310, Q3312-Q3320	①
D3301, D3302	④

∗: Refer to Terminal name of semiconductors in silk screen printed circuit (see page 55)

— B3 BOARD —

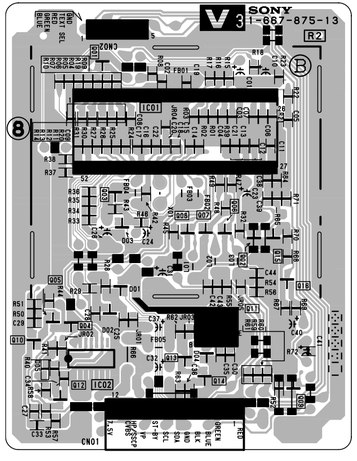


V3 BOARD
Terminal name of semiconductors in silk screen printed circuit (∗)

Ref.	∗
Q01, Q03-Q10, Q12	①
D02	⑩
D03, D04	④
D05	③

∗: Refer to Terminal name of semiconductors in silk screen printed circuit (see page 55)

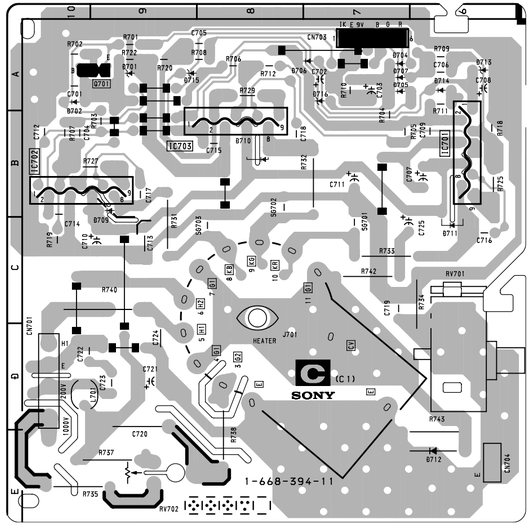
— V3 BOARD —



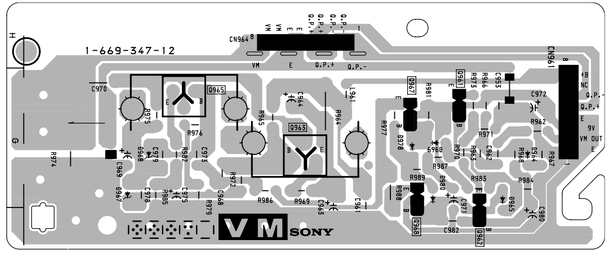
C1 [RGB OUTPUT] VM [VOLOCITY MODULATION]

NOTE:
The circuit indicated as left contains high voltage of over 600 Vp-p. Care must be paid to prevent an electric shock in inspection or repairing.

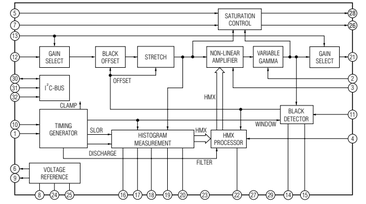
— C1 BOARD —



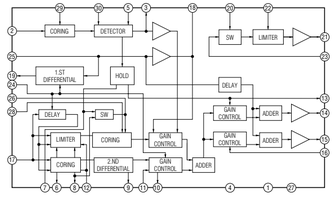
— VM BOARD —



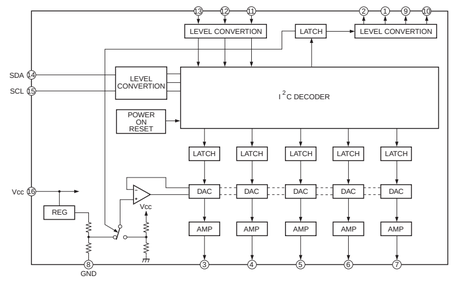
• B3 BOARD IC3301 TDA9170



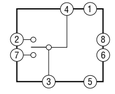
• B3 BOARD IC3302 AN5342K

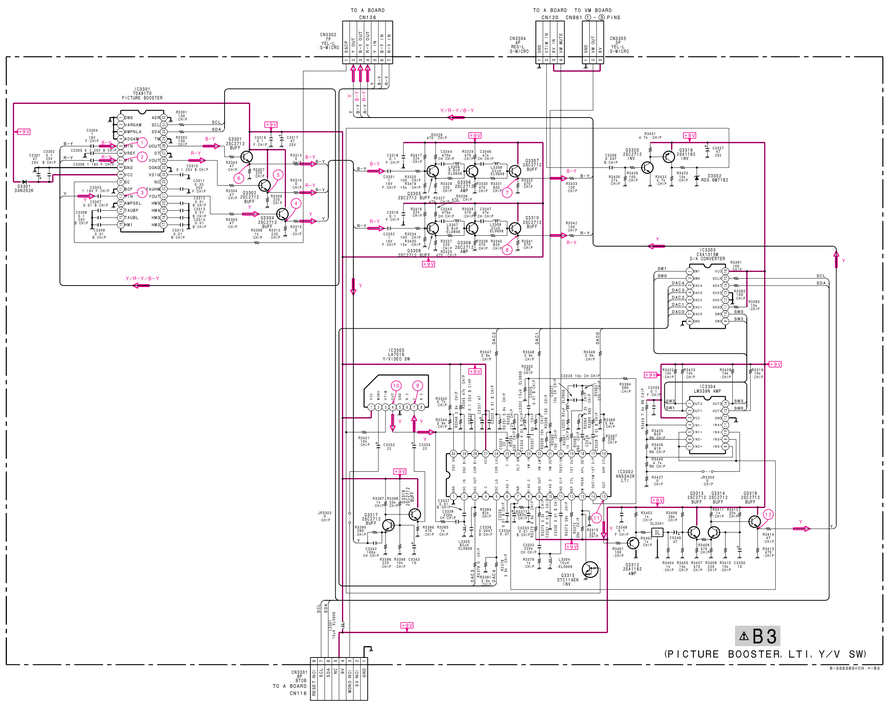


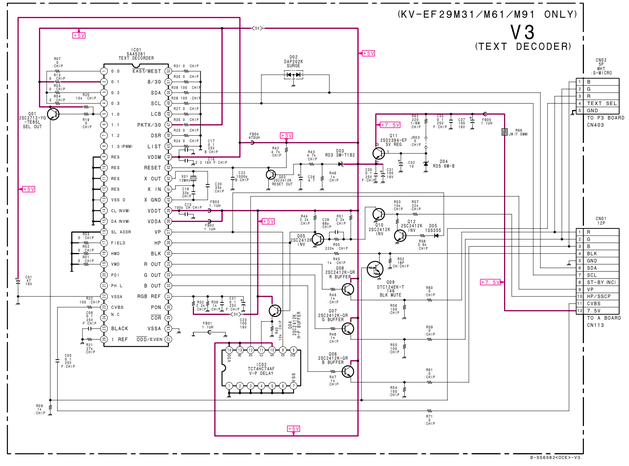
• B3 BOARD IC3303 CXA1315M

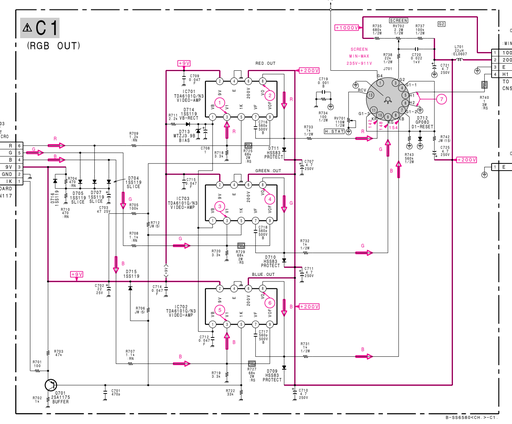


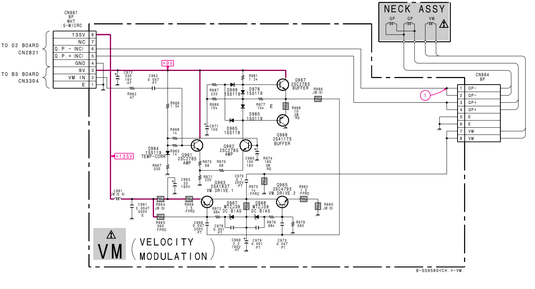
• B3 BOARD IC3305 LA7016

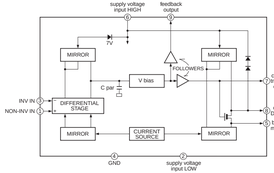












• V3 BOARD WAVEFORMS

①	②	③
4.5 Vp-p (12MHz)	4.6 Vp-p (V)	4.4 Vp-p (H)

• V3 BOARD VOLTAGE LIST

Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]
IC01	1	0	IC02	9	0.3		B	0
	2	4.4		11	0.9	Q09	C	0
	3	0		12	0.9		B	0
	4	0	Q01	E	0	Q10	C	0
	5	0		B	0		B	0
	23	2.1	Q03	C	0	Q11	E	4.4
	25	1.8		B	0.7		C	5.8
	26	2.2	Q04	E	0.9		B	5.1
	31	1.4		B	1.1	Q12	C	0.3
	32	0	Q05	C	1.1		B	0
	33	0		B	0.3	Q13	E	5.1
	34	0	Q06	E	0		C	0
	35	0		B	0		B	0
	36	1.1	Q07	E	0	Q14	C	0
	37	0.3		B	0			
	41	2.1	Q08	C	0			
	42	2.2						
	43	0						
	49	4.5						
	50	4.5						

• V3 BOARD DESCRIPTION

REF. NO.	
IC01	TEXT DECORDER
IC02	V-P DELAY
Q01	SEL OUT
Q03	RESET OUT
Q04	H-P BUFF
Q05	INVERTER
Q06	B BUFF
Q07	G BUFF
Q08	R BUFF
Q09	BLK MUTE
Q10	INVERTER
Q11	5V REG
Q12	INVERTER

• C1 BOARD DESCRIPTION

REF. NO.	
IC701	VIDEO AMP
IC702	VIDEO AMP
IC703	VIDEO AMP
Q701	BUFF

• C1 BOARD VOLTAGE LIST

Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]
IC701	1	3.6	IC702	1	3.6	IC703	1	3.6	Q701	E	5.8
	3	3.5		3	3.5		3	3.5		C	0
	5	8.3		5	8.0		5	8.0		B	8.1
	7	140		7	152		7	146			
	8	141		8	154		8	148			
	9	138		9	151		9	144			

• C1 BOARD WAVEFORMS

①	②	③
0.8 Vp-p (H)	130 Vp-p (H)	0.8 Vp-p (H)
④	⑤	⑥
115 Vp-p (H)	0.9 Vp-p (H)	110 Vp-p (H)
⑦		
24.4 Vp-p (H)		

• VM BOARD DESCRIPTION

REF. NO.	
Q961	AMP
Q962	AMP
Q963	VM DRIVE 1
Q965	VM DRIVE 2
Q967	BUFF
Q968	BUFF

• VM BOARD VOLTAGE LIST

Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]
Q961	E	1.6	Q965	E	0
	B	2.2		C	63.8
Q962	E	1.6		B	0.2
	C	4.3	Q967	E	4.9
	B	2.2		B	5.5
Q963	C	63.8	Q968	E	4.9
	B	134		B	4.3

• VM BOARD WAVEFORM

①
35.6 Vp-p (H)

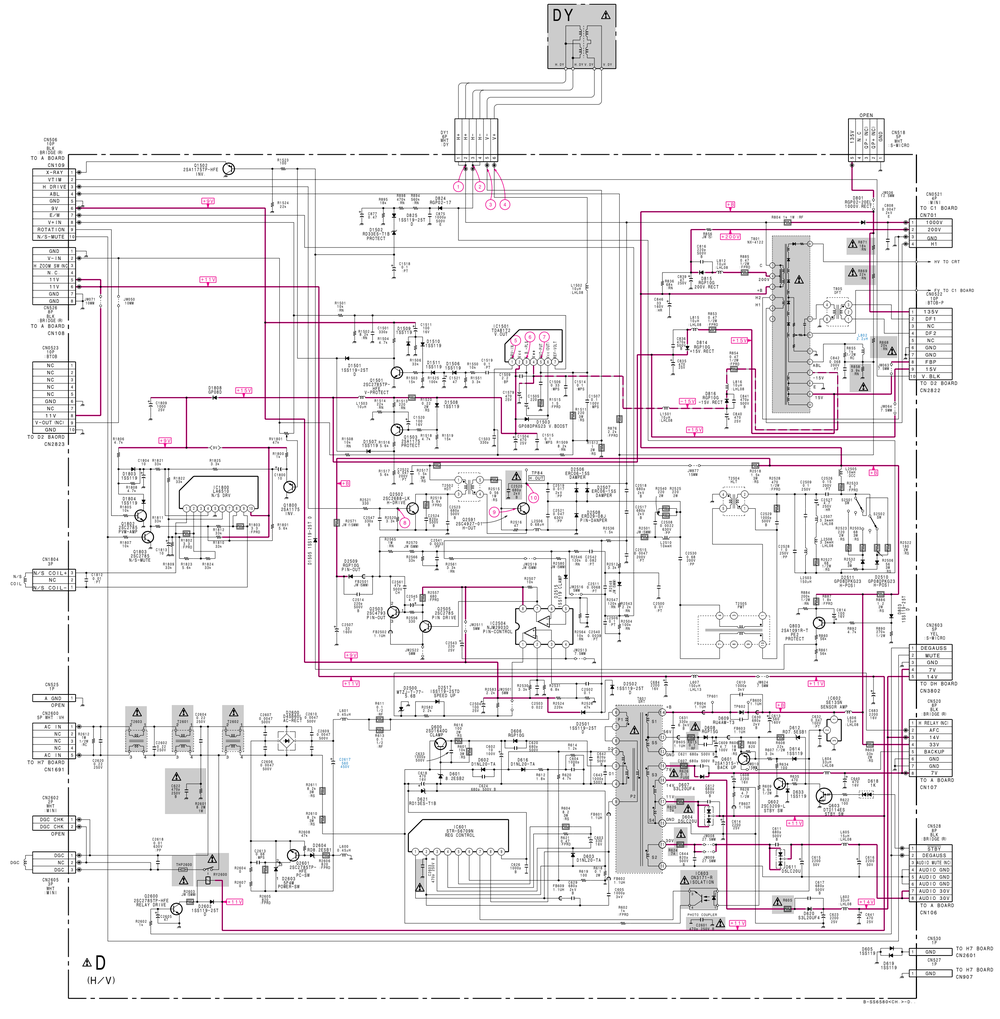
Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]
IC3301	5	1.5		5	2.8		28	5.2		8	3.1
	6	4.0		6	3.1		29	0.7		9	3.1
	7	1.6		7	3.1		30	4.1		10	0
	10	0.7		8	3.1	IC3303	1	0		13	0.2
	12	1.8		9	2.8		2	0		14	9.1
	14	0.7		10	3.5		3	4.5	IC3305	2	5.6
	15	1.7		11	2.7		4	3.2		3	0
	16	0.4		12	4.6		5	3.4		4	4.9
	17	0.5		13	3.3		6	5.8		7	5.5
	18	0.5		14	3.3		7	2.4	Q3301	E	1.8
	19	0.3		15	4.1		9	0		B	2.5
	20	0		16	1.4		10	9.1	Q3302	E	1.8
	21	2.2		17	4.8		11	9.1		B	2.4
	22	1.6		18	3.2		14	4.5	Q3304	E	1.6
	24	5.0		19	6.2		15	4.5		B	2.2
	26	2.4		20	0	IC3304	1	0	Q3305	E	C
	28	2.5		21	7.5		2	0		C	B
	30	4.6		22	3.4		4	4.2		B	3.5
	31	4.5		23	2.3		5	3.1			
IC3302	2	2.7		24	0		6	3.7			
	3	5.1		25	5.4		7	3.1			
				26	1.6						

Ref.	Pin No.	Voltage [V]
Q3306	E	2.1
	C	6.8
	B	2.8
Q3307	E	1.5
	B	2.1
Q3308	E	2.8
	B	6.2
Q3309	E	2.1
	C	6.9
	B	2.7
Q3310	E	1.4
	B	2.1
Q3312	E	4.8
	B	4.8
Q3313	E	1.7
	B	2.4
Q3314	E	1.3
Q3315	C	4.2
	B	2.0
	C	3.1
	B	0
Q3316	E	3.5
	B	4.1
Q3317	E	1.3
	C	4.1
	B	1.9
Q3318	E	3.5
	B	4.2
Q3319	C	0.2
	B	9.1
Q3320	C	9.1
	B	−0.2

①	②	③	④
1.9 Vp-p (H)	1.5 Vp-p (H)	1.0 Vp-p (H)	1.0 Vp-p (H)
⑤	⑥	⑦	⑧
1.6 Vp-p (H)	1.9 Vp-p (H)	1.9 Vp-p (H)	1.5 Vp-p (H)
⑨	⑩	⑪	⑫
2.4 Vp-p (H)	2.4 Vp-p (H)	1.3 Vp-p (H)	1.1 Vp-p (H)

Schematic diagram
← (b3)(c1)
(v3)(vm) boards

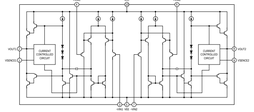
Schematic diagrams
D (d2)(dh) boards →



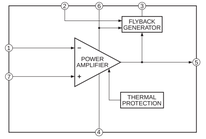
① 950 Vp-p (H)	② 166 Vp-p (H)
③ 2.0 Vp-p (V)	④ 53.2 Vp-p (V)
⑤ 0.9 Vp-p (V)	⑥ 29.6 Vp-p (V)
⑦ 53.2 Vp-p (V)	⑧ 144 Vp-p (H)
⑨ 25.2 Vp-p (H)	⑩ 950 Vp-p (H)

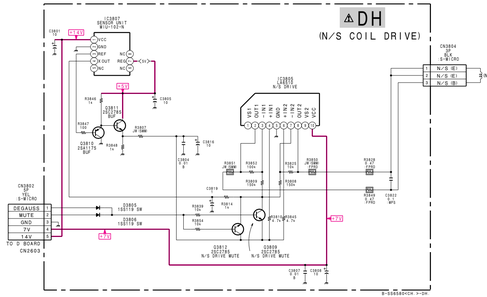
Ref.	Pin No.	Voltage [V]
IC601	1	289
	2	0
	3	0
	4	0.8
	5	1.3
	6	0
	7	0.2
	8	1.6
	9	8.4
IC602	2	64.7
IC603	1	65.6
	2	64.6
	3	0.2
	4	8.2
IC1501	1	1.3
	3	−13.5
	5	0.4
	7	1.3
IC1800	1	6.4
	2	6.4
	3	6.4
	4	6.4
	6	6.4
	7	6.4
	8	6.3
	9	6.4
Q600	E	8.4
	C	84.0
	B	8.2
Q601	E	70.9
	C	10.2
	B	70.8
Q602	C	70.8
	B	0
Q603	C	0
	B	4.1
Q803	C	0
	B	134
Q1501	C	0
	B	0.6
Q1502	E	0.6
	B	0
Q1503	E	13.0
	C	0.2
	B	12.5
Q1800	E	4.1
	B	3.5
Q1802	C	4.1
	B	0.3
Q1803	C	6.4
	B	0
Q2502	C	68.6
	B	0
Q2503	C	19.3
	B	2.5
Q2505	C	2.5
	B	0
Q2591	C	137
	B	−0.2
Q2600	C	11.3
	B	0
Q2601	E	−0.3
	C	0
	B	−0.4

• DH BOARD IC3805 LA6510



• D BOARD IC1501 TDA8172



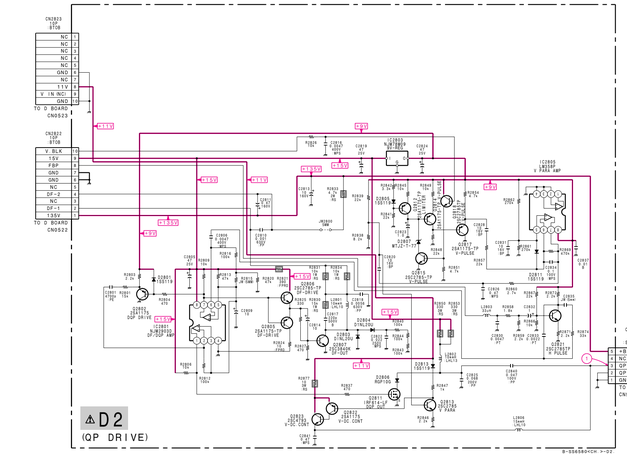


• DH BOARD VOLTAGE LIST

Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]
IC3805	1	2.4		C	2.5
	2	2.7		B	1.0
	3	2.6			
	4	2.7	Q3810	E	3.2
	6	2.6		B	2.6
	7	2.6			
	8	2.5	Q3811	E	2.6
				B	3.2
IC3807	3	2.5			
	4	2.0	Q3812	E	2.5
				C	2.6
Q3809	E	2.6		B	0

• DH BOARD DESCRIPTION

REF. NO.	
IC3805	N/S DRIVE
IC3807	SENSOR UNIT
Q3809	N/S DRIVE MUTE
Q3810	BUFF
Q3811	BUFF
Q3812	N/S DRIVE MUTE



• D2 BOARD VOLTAGE LIST

Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]
IC2801	1	6.1	Q2812	E	8.2
	2	6.5		C	8.2
	3	6.6		B	7.6
	5	6.6			
	6	6.5	Q2813	E	4.4
	7	1.5		C	8.1
				B	5.0
IC2803	I	13.2			
	O	9.0	Q2814	E	8.7
				C	0.8
IC2805	5	4.4		B	8.2
	6	4.5			
	7	4.5	Q2815	C	3.5
				B	0
Q2802	E	2.1			
	B	1.5	Q2817	E	1.4
				B	0.8
Q2805	E	1.5			
	C	0	Q2818	E	0
	B	1.5		B	−2.5
Q2806	E	1.5	Q2821	E	2.1
	C	8.3		C	7.3
	B	1.5		B	1.8
Q2807	C	42.6	Q2822	C	2.1
	B	−0.2		B	8.1
Q2811	E	2.1	Q2823	E	1.3
	C	7.3		B	2.1
	B	1.8			

• D2 BOARD DESCRIPTION

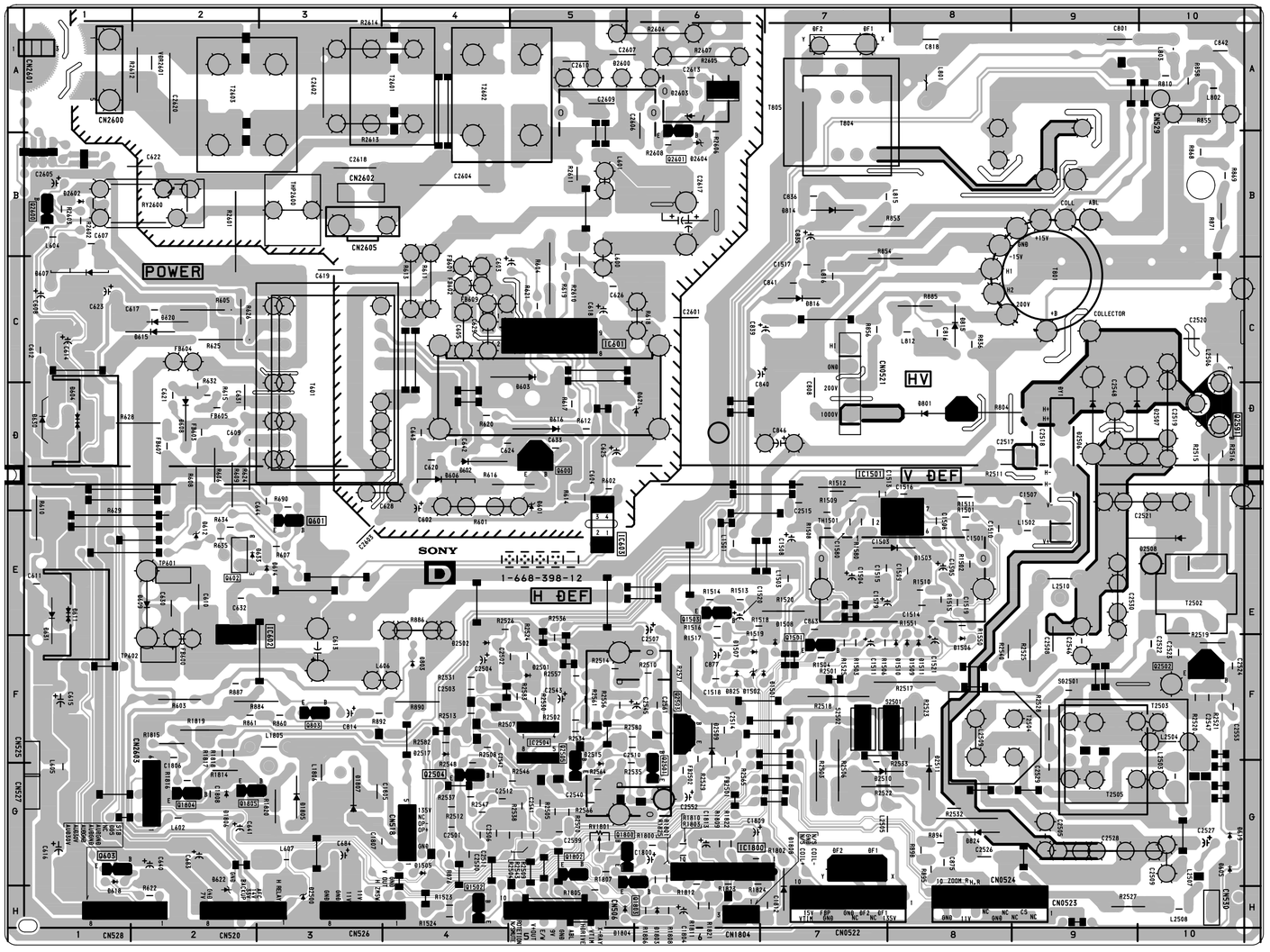
REF. NO.		REF. NO.		REF. NO.	
IC2801	DF/DQP AMP	Q2807	DF OUT	Q2817	V PULSE
IC2803	9V-REG	Q2811	DQP OUT	Q2818	V PULSE
IC2805	V PARA AMP	Q2812	LIMITTER	Q2821	H PULSE
Q2802	DQP DRIVE	Q2813	V PARA	Q2822	V-DC CONT
Q2805	DF DRIVE	Q2814	V PULSE	Q2823	V-DC CONT
Q2806	DF DRIVE	Q2815	V PULSE		

• D2 BOARD WAVEFORM

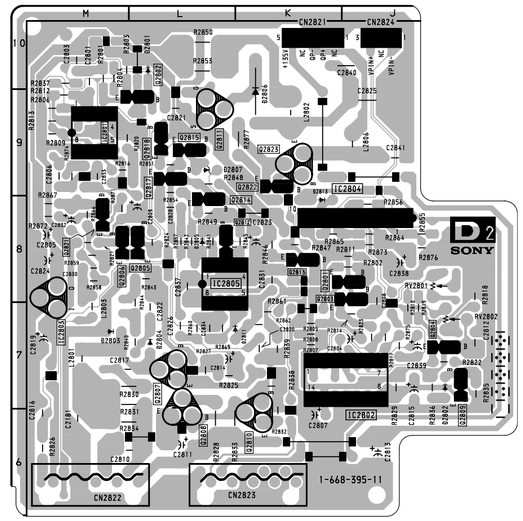
[ ]

D2 [QP DRIVE] **DH** [N/S COIL DRIVE]

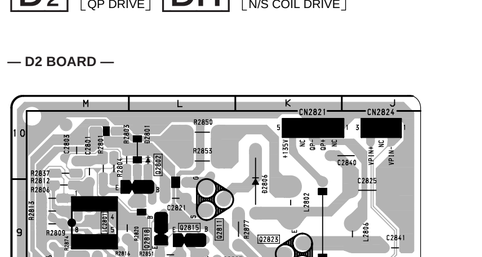
— D BOARD —



— D2 BOARD —



— DH BOARD —

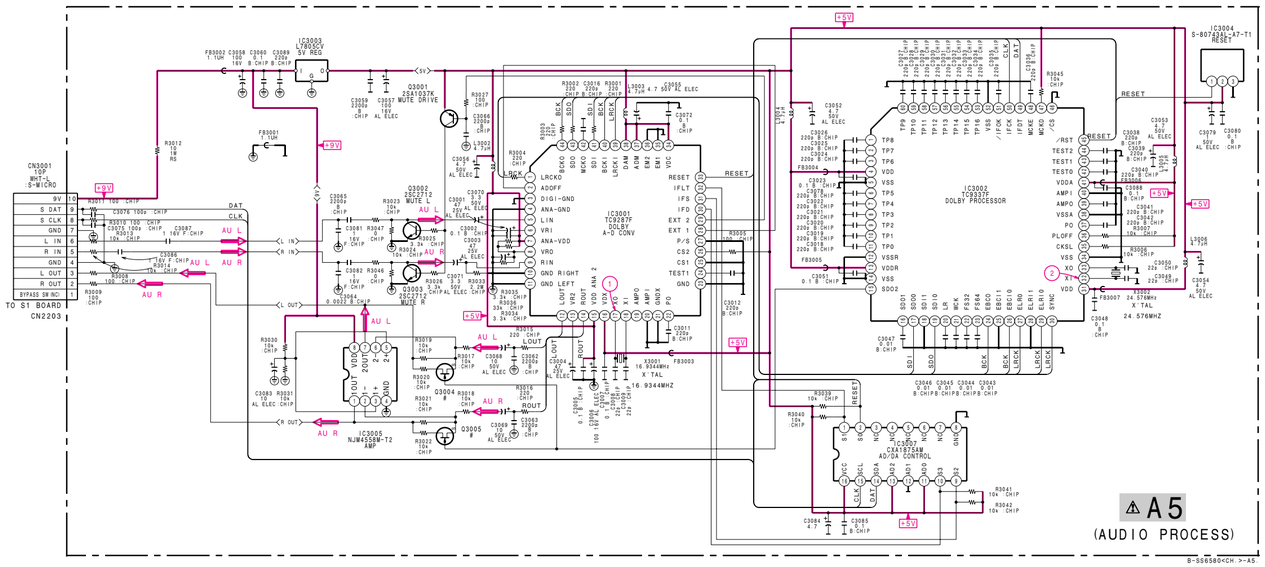


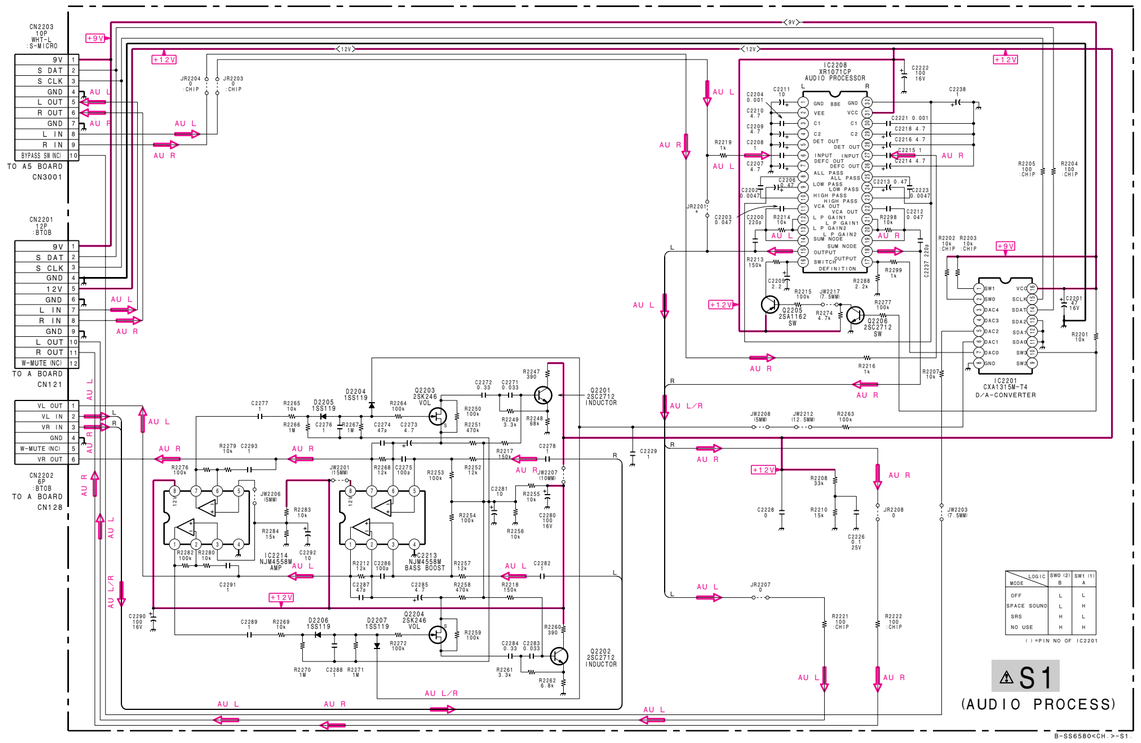
• D BOARD SEMICONDUCTOR LOCATION

IC		DIODE		D1506	F–8
IC601	C–5	D601	D–5	D1507	F–6
IC602	E–2	D602	D–4	D1508	F–7
IC603	E–5	D603	C–5	D1509	F–8
IC1501	D–8	D604	D–1	D1510	F–8
IC1800	G–6	D605	G–10	D1511	F–8
IC2504	F–5	D606	D–4	D1803	H–6
		D607	C–1	D1804	H–5
TRANSISTOR		D608	D–2	D1808	H–7
Q600	D–5	D609	E–2	D2500	H–3
Q601	E–3	D611	E–1	D2501	F–5
Q602	E–2	D612	E–2	D2502	F–4
Q603	G–1	D614	E–3	D2506	D–9
Q803	F–3	D616	D–5	D2507	D–9
Q1501	F–7	D618	G–1	D2508	E–10
Q1502	H–4	D619	G–10	D2509	F–6
Q1503	E–6	D620	C–2	D2510	G–7
Q1800	G–5	D621	D–6	D2511	G–8
Q1802	G–5	D633	E–2	D2515	G–5
Q1803	G–5	D801	D–8	D2517	F–4
Q2502	F–10	D803	F–4	D2600	A–5
Q2503	F–6	D814	B–7	D2602	B–1
Q2505	F–5	D815	C–8	D2603	A–6
Q2591	D–10	D816	C–7	D2604	B–6
Q2600	B–1	D824	G–8		
Q2601	A–6	D825	F–6	VARIABLE RESISTOR	
		D1501	F–7		
		D1502	F–6	RV1801	G–5
		D1503	E–8		
		D1505	G–4		

NOTE:
The circuit indicated as left contains high voltage of over 600 Vp-p. Care must be paid to prevent an electric shock in inspection or repairing.

Schematic diagrams
A3 A5 S1 boards ➡





• A5 BOARD DESCRIPTION

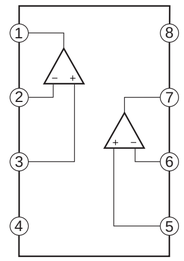
REF. NO.	
IC3001	A/D CONVERTER
IC3002	DOLBY PROCESSOR
IC3003	5V REG
IC3004	RESET
IC3005	AMP
IC3007	AD/DA CONTROL
Q3001	MUTE DRIVE
Q3002	MUTE L
Q3002	MUTE R

• A5 BOARD WAVEFORMS

① 6.0 Vp-p (16.9344MHz)

② 4.2 Vp-p (24.576MHz)

• A5 BOARD IC3005 NJM4558M-T2



• A5 BOARD VOLTAGE LIST

Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]
IC3001	1	2.5		31	5.0		16	3.5		45	5.0	IC3005	1	4.5
	2	0		32	5.0		17	3.0		47	0		2	4.5
	5	2.8		33	5.0		19	3.7		48	4.9		3	4.5
	6	2.5		39	2.5		20	2.5		49	4.3		5	4.5
	7	5.0		40	2.5		21	2.5		50	4.5		6	4.5
	8	3.2		41	2.8		22	2.5		51	4.9		7	4.7
	9	3.9		42	2.4		23	2.5		53	4.9	IC3007	1	5.0
	12	2.1		43	3.8		24	2.5		54	5.0		2	5.0
	13	2.5		44	2.5		25	2.5		55	4.9		9	5.0
	14	3.0					26	2.5		56	5.0		10	0
	16	5.0	IC3002	1	5.0		27	2.5		57	5.0		14	4.5
	17	2.4		2	5.0		29	2.5		58	5.0		15	4.5
	18	2.0		3	5.0		30	2.5		59	5.0	Q3001	C	–0.6
	19	5.0		6	5.0		32	2.0		60	5.0		B	5.0
	22	0		7	5.0		33	2.3	IC3003	I	9.0	Q3002	C	0
	24	5.0		8	5.0		35	5.0		O	5.0		B	–0.6
	26	5.0		9	5.0		36	5.0	IC3004	1	5.0	Q3003	C	0
	28	0		10	5.0		37	0		2	GND		B	–0.6
	29	5.0		11	5.0		39	5.0						
	30	0		15	5.0		42	5.0						
							43	4.9						
							44	4.9						

• S1 BOARD VOLTAGE LIST

Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]
IC2201	1	0.2		15	4.5		10	5.7		20	5.7		30	5.7		3	7.0		C	11.5	Q2205	E	11.8
	2	0.2	IC2208	1	5.7		11	5.7		21	5.7	IC2213	1	5.8		5	7.0		B	5.3		C	11.8
	3	0.5		3	5.7		12	5.7		22	5.7		2	5.8		6	7.0	Q2203	S	5.6		B	11.2
	4	4.6		4	5.7		13	5.7		23	5.7		3	5.8		7	7.0		D	5.3	Q2206	C	0
	5	0.4		5	5.7		14	5.7		24	5.7		5	5.8	Q2201	E	4.7		G	0.8		B	0.7
	6	0.4		6	5.7		15	5.7		25	5.7		6	5.8		C	11.5	Q2204	S	5.7			
	7	8.6		7	5.7		16	6.4		26	5.7		7	5.8		B	5.2		D	5.2			
	9	3.7		8	5.7		17	6.0		27	5.7	IC2214	1	7.0	Q2202	E	4.7		G	0.8			
	10	8.3		9	5.7		18	5.7		28	5.7		2	7.0									
	14	4.5					19	5.7		29	5.7												

• A3 BOARD VOLTAGE LIST

Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]	Ref.	Pin No.	Voltage [V]
IC1330	9	4.4		40	6.5		52	3.9		62	2.5	Q1331	E	2.0	Q1334	E	0.9
	10	4.5		42	3.8		53	3.9		63	2.4		B	2.6		C	7.1
	24	4.9		43	3.9		54	2.7	IC1331	I	8.4	Q1332	E	2.0		B	1.5
	28	2.7		44	3.9		55	3.9		O	5.1		B	2.6	Q1335	E	6.4
	29	2.7		45	3.9		57	5.1	Q1330	E	*	Q1333	E	3.5		B	7.1
	31	3.9		46	3.9		58	1.6		C	*		B	4.1			
	32	3.9		47	3.9		59	1.6		B	*						
	38	7.4		49	3.9		60	0									
	39	8.3		50	3.9												

• A3 BOARD DESCRIPTION

REF. NO.	
IC1330	SOUND DECODER
IC1331	5V REG
Q1330	BUFF
Q1331	BUFF
Q1332	BUFF
Q1333	AMP
Q1334	BUFF
Q1335	BUFF

• A3 BOARD WAVEFORMS

① 3.2 Vp-p (18.432MHz)

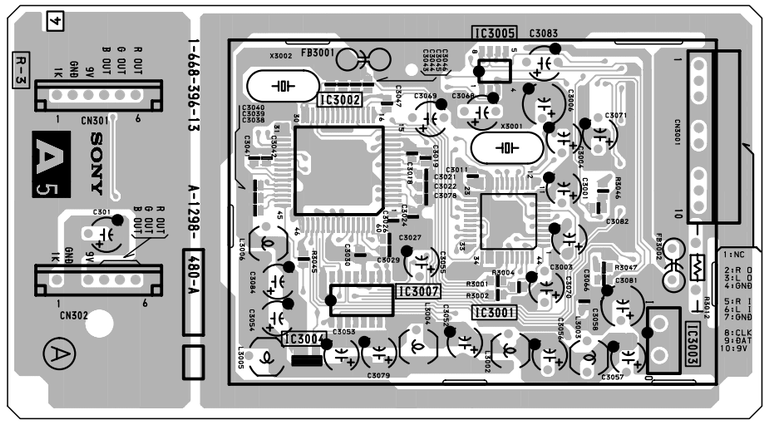
KV-EF29M31/EF29M61/EF29M80/
EF29M90/EF29M91 RM-881

A5 [AUDIO PROCESS]

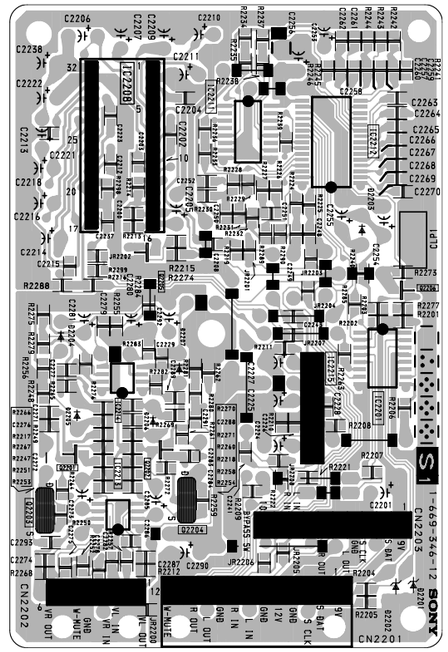
[ ]

A3 [SOUND DECODER]

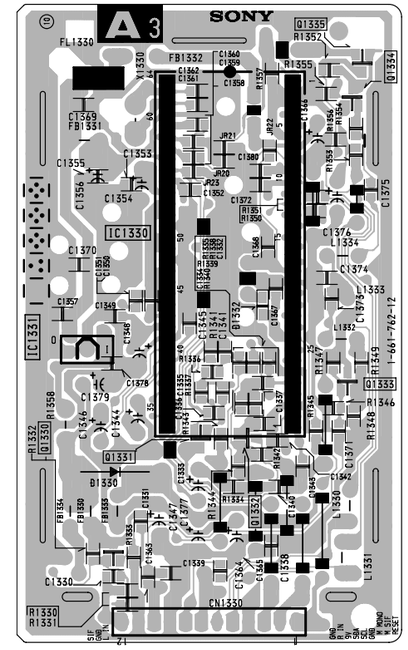
— A5 BOARD (Component Side) —

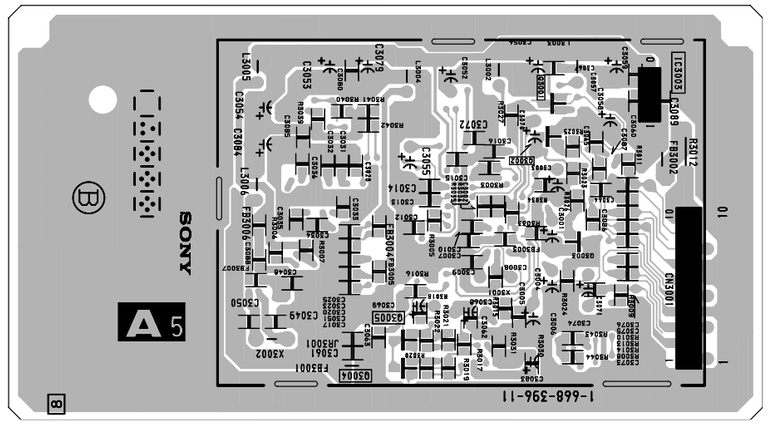


— S1 BOARD —



— A3 BOARD —





S1 BOARD
Terminal name of semiconductors in silk screen printed circuit (∗)

Ref.	∗
Q2201, Q2202, Q2205-Q2207	①

∗: Refer to Terminal name of semiconductors in silk screen printed circuit (see page 55)

A3 BOARD
Terminal name of semiconductors in silk screen printed circuit (∗)

Ref.	∗
D1332	③
Q1330-Q1335	①

∗: Refer to Terminal name of semiconductors in silk screen printed circuit (see page 55)

A5 BOARD
Terminal name of semiconductors in silk screen printed circuit (∗)

Ref.	∗
Q3001-Q3003	①

∗: Refer to Terminal name of semiconductors in silk screen printed circuit (see page 55)